Vol. 8, No. 8 AUGUST, 1953

AGRICULTURAL CHEMICALS

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Phosphate & Fertilizer, Ideal Partnership For Agriculture

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Northwestern Fertilizer Conference Held

•

Pesticides and Meat Contamination

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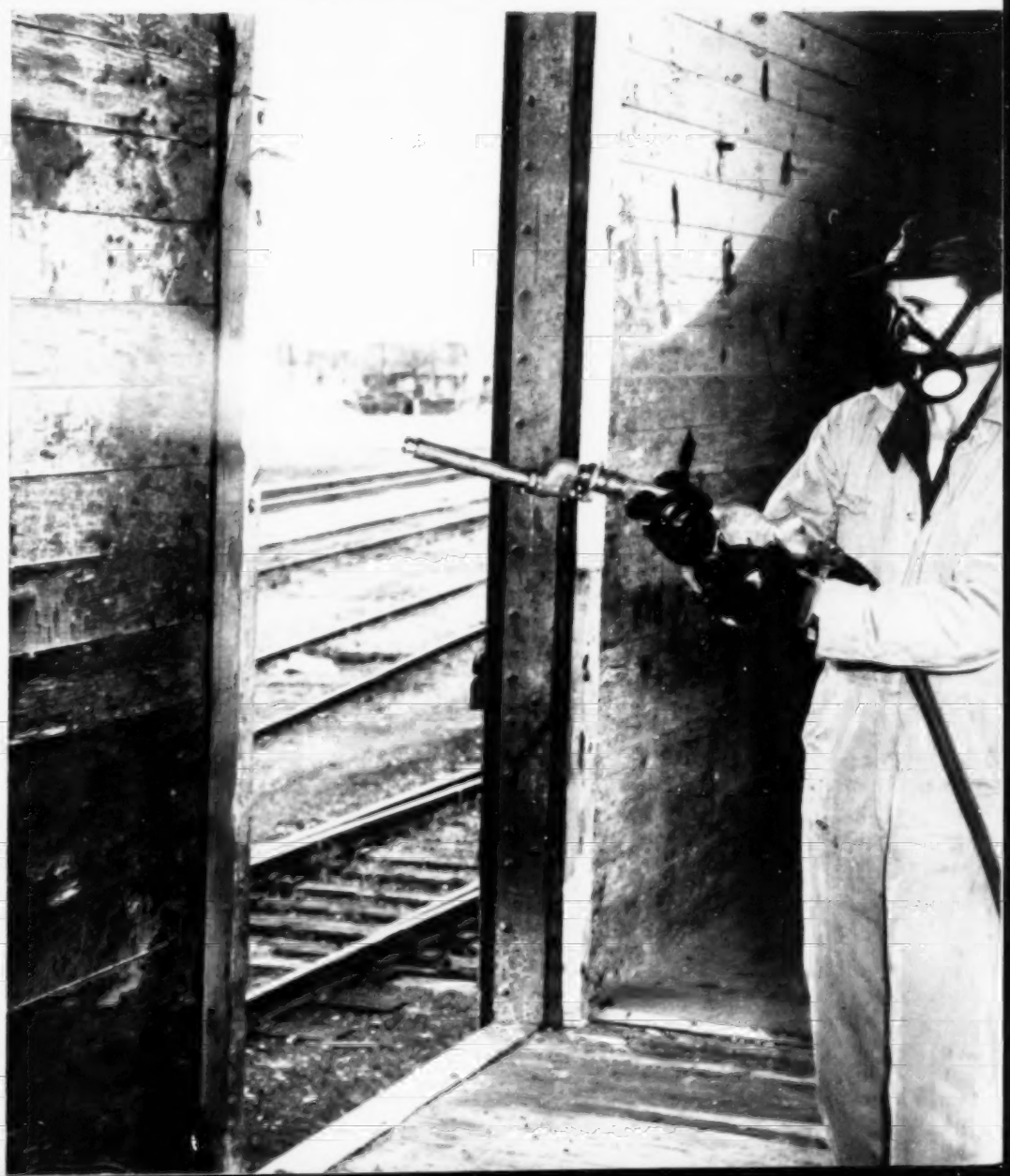
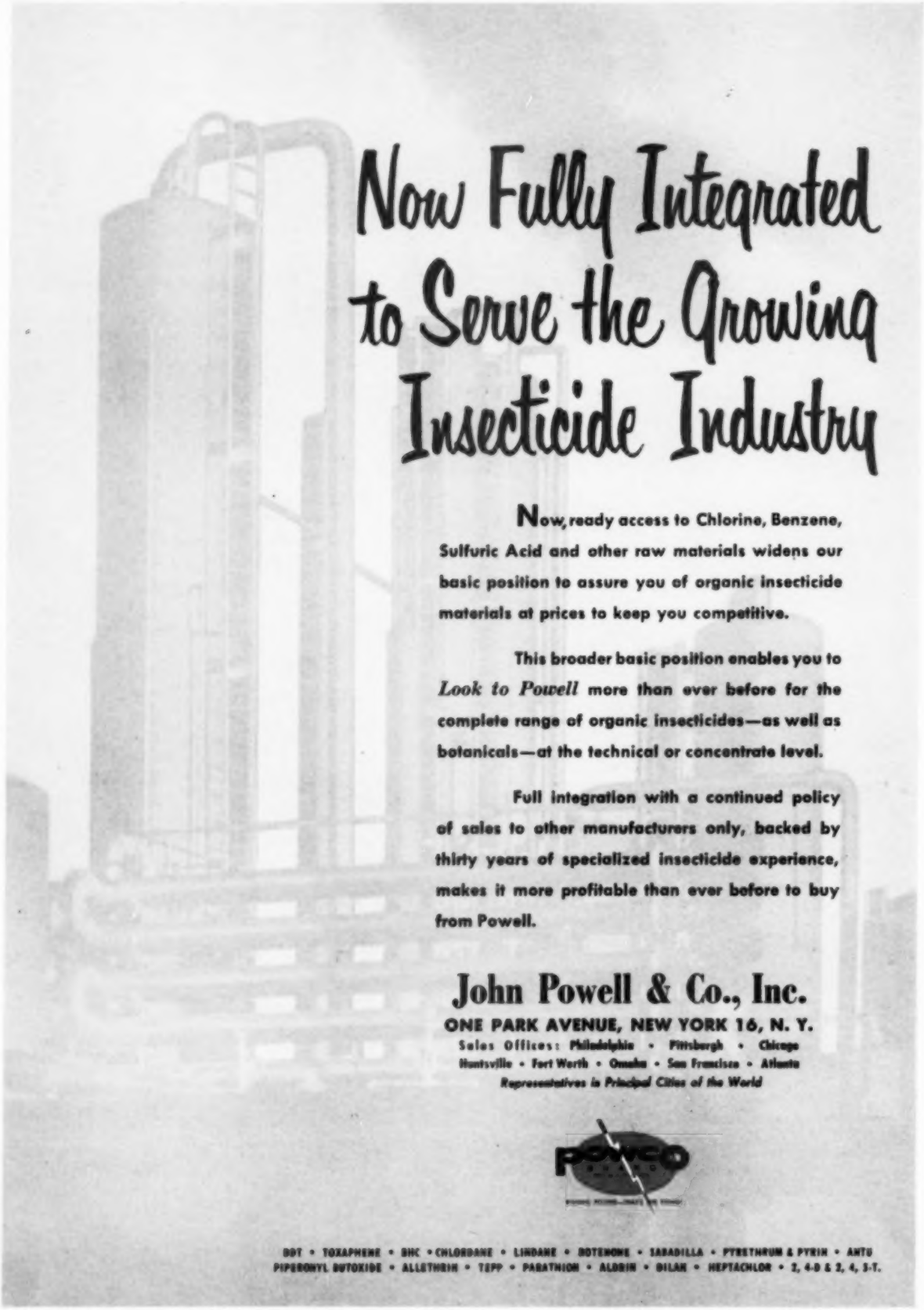
Southern Control Officials Meet in S. C.

•

Fertilizer Use in California





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Now, ready access to Chlorine, Benzene, Sulfuric Acid and other raw materials widens our basic position to assure you of organic insecticide materials at prices to keep you competitive.

This broader basic position enables you to *Look to Powell* more than ever before for the complete range of organic insecticides—as well as botanicals—at the technical or concentrate level.

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AGRICULTURAL CHEMICALS

THIS MONTH'S COVER:

Insecticides play a major part in keeping grain clean and free from infestation in transit. Not only must elevators be kept free from weevils and other insect pests, but railway cars, too, must be cleaned and sprayed thoroughly, as shown here, to prevent loss of grade in transit. (See article on page 30, this issue).

Vol. 8 No. 8
AUGUST 1953

A Monthly Magazine For the Trade

•

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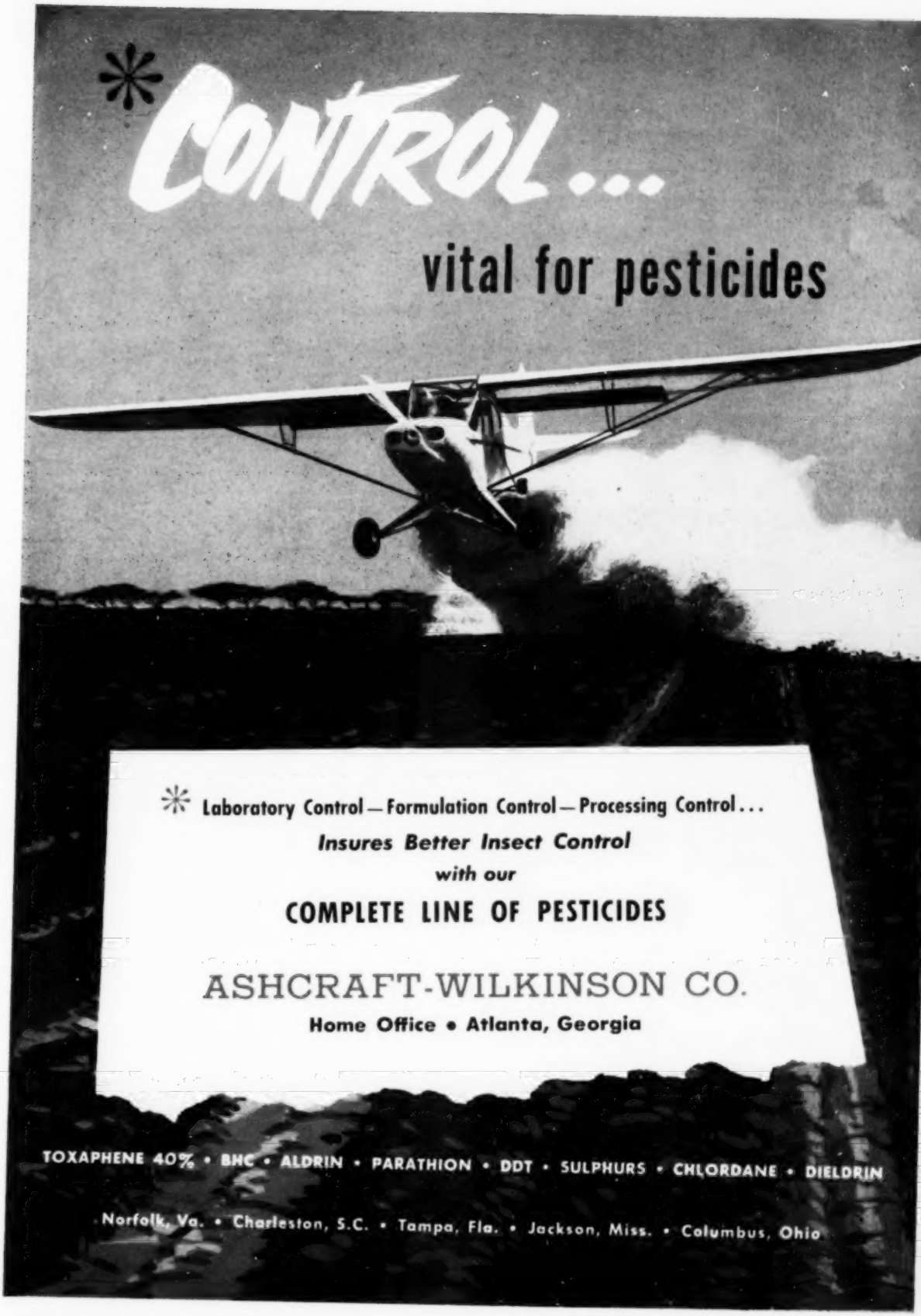
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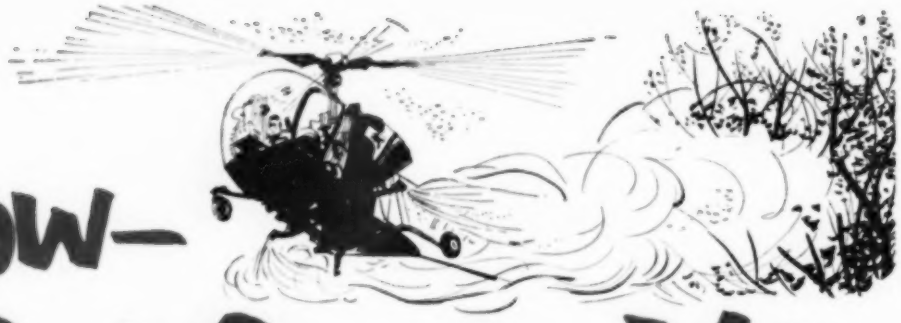

NOW— Safest Carrier Yet

FOR PESTICIDES, PLANT NUTRIENTS!

New S/V Sovaspray 100

won't injure plants,
spreads 25 times better,
penetrates plant tissue!

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What it is

S/V Sovaspray 100 is a low-viscosity, colorless, virtually odorless isoparaffinic oil. *It has extremely low phytotoxicity*—thus can be applied *without injury* to many types of economic crops, ornamentals and shade trees without dilution—*even to the point of run-off.* It has the ability to penetrate plant tissue, can be readily emulsified if desired, is completely compatible with other mineral oils. And it spreads 25 to 50 times better than other hydrocarbon carriers!

Effect on plants, animals

A wide variety of commercial crops, flowers, shrubs and trees has been tested and, without exception, S/V Sovaspray 100 has proved far safer than any other carrier now used. Among the varieties tested were bean, potato, beet, cotton, corn, apple, peach, rose, gardenia, pine, elm, etc.

In tests on animals S/V Sovaspray 100 did not cause systemic toxicity even at high dermal dosage levels.

Its potential applications

As a solvent, vehicle and synergist for oil-soluble insecticides and fungicides.

As a vehicle for pesticides used in low-volume spray equipment, such as planes, helicopters, hand sprays.

As a vehicle for application of nutrients, plant hormones, plant regulators, systemic insecticides and fungicides, defoliants.

As a carrier and penetrant for selected chemical herbicides.

As a diluent, or "safener," to inhibit phytotoxicity of other carriers.

As a carrier for oil-soluble organo-metallic fungicides.

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FARMERS' ANGLE

The way farmers see it, there has to be relief from the squeeze between farm prices and farm costs.

Fertilizer and modern farm machinery are two ways in which to lower unit production cost.

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Chemicals you live by

Left – untreated onion; Right – treated with MH-40

Naugatuck nips storage growth in bud!

The United States Rubber Company's Naugatuck Chemical Division has good reason to believe it has dealt a death blow to destructive storage growth. The reason is a new Naugatuck chemical – a water soluble salt containing 40% maleic hydrazide and called MH-40.*

Every grower knows the advantage of storing away part of a crop like onions until the market is more favorable. And every grower also knows the risk involved – namely, the sprouting, shriveling and wrinkling which can make that crop unsalable.

As far back as 1947, Naugatuck's research scientists came up with the first version of MH-40. Since then, working in cooperation with more than 250 experiment stations and other agriculturists, they have discovered hundreds of potential uses for this unique new chemical. One of these uses was for the inhibition of storage growth.

Today MH-40 is commercially available as a grass inhibitor and wild-onion killer. And it won't be long before it will be made available as a storage growth inhibitor, too!

*U. S. Pat. No. 2,614,916

MH-40 is one more example of Naugatuck know-how at work, always striving to introduce new and better products to the agricultural field.

UNITED STATES RUBBER COMPANY Naugatuck Chemical Division, Naugatuck, Conn.

manufacturers of seed protectants – Spergon, Spergon-DDT, Spergon-SL, Spergon-DDT-SL, Phygon Seed Protectant, Phygon Naugets, Phygon-XL-DDT, Thiram Naugets, Thiram 50 Dust – fungicides – Spergon Wettable, Phygon-XL – insecticides – Synklor-48-E, Synklor-50-W – fungicide-insecticides – Spergon Gladiolus Dust, Phygon Rose Dust – miticides – Aramite – growth retardants and herbicides – MH-30, MH-40 – pre-emergence weed killers – Alanap-I.

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Spring application of 10-10-10 increases wheat yield 8-13 bushels

for Ray Whetstone, Lima, Ohio

250 pounds of 10-10-10 fertilizer applied in the spring paid off well for Ray Whetstone of Lima, Ohio. It boosted his yield from a 25-30 bushel average in previous years to 38 bushels per acre in 1952. Fall fertilization was the same; the 10-10-10 made the difference.

Mr. Whetstone's 38 bushel figure was even more outstanding when you consider the average yield in Allen County in 1952 was 22-23 bushels. He also makes good use of high-nitrogen fertilizers and straight-nitrogen materials on corn and pasture for his breeding herd of 35 Herefords.

Ray Whetstone (*right*) talks over good fertilization practices with his county agricultural agent, Herbert H. Hadley.

Bigger yields for farmers mean better business for you

Time and again it has been proved that high-nitrogen fertilizers yield a profitable return to the farmers who use them. And they can be equally profitable to mixers and dealers who sell them.

A little extra sales effort on high-nitrogen fertilizers will pay off for you. Farmers who use them tell their neighbors about the increased yields and demand grows rapidly.

Farmers especially like high-nitrogen fertilizers that get a major part of their nitrogen content from U·S·S Ammonium Sulphate. This is a dry free-running material that behaves well in storage and doesn't tend to clog drills or other distributing equipment.

Get full information on U·S·S Ammonium Sulphate from your nearest Coal Chemical sales office, or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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Easy, too. Heptachlor can be applied in wettable powders, emulsifiable concentrates or free-flowing dusts. So, for an easier, bigger cotton yield, get Heptachlor, the more economical cotton insect toxicant. Contact your dealer, county agent, or write to us right away for complete facts and information about Heptachlor.

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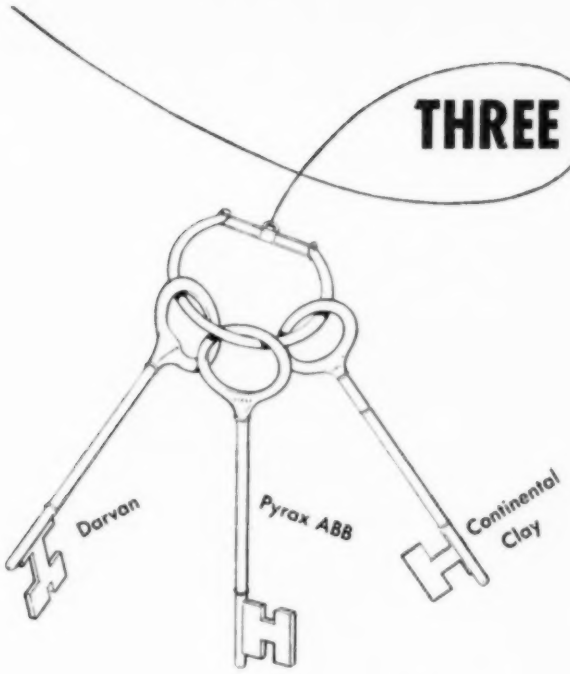

THREE keys for better dusts better sprays

NEW BULLETIN D23, just off the press, explains why Vanderbilt carriers, diluents and dispersing agents are your keys to more effective dusts and sprays. This bulletin will help you use these fine chemicals to improve the quality of your products.

Pyrax ABB

The most widely used Pyrophyllite in the agricultural field, Pyrax ABB is principally applied as a carrier for insecticides and fungicides. Pyrax ABB is also used in lesser quantities in seed protectants, weed control, defoliant dusts, and many other applications.

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Non-drifting, Pyrax ABB produces a dense cloud that hugs the crop and adheres electrostatically — even to the dry underside of foliage — insuring less waste and permitting effective daytime dusting.

Increased plant capacity now assures an adequate supply of Pyrax ABB.

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- ☐ Please send sample of DARVAN.
- ☐ Please send sample of CONTINENTAL CLAY.

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Air view showing dryers and rock storage at Pierce, Florida, headquarters of A.A.C. phosphate mining operations. (Top) Sample of Florida Pebble Phosphate Rock, source of phosphorus widely used in the chemical industries, in its elemental form as well as in phosphoric acid, phosphates and phosphorus compounds. Q This pebble rock is also the principal source of the most important—and most generally deficient—plant food element. Often called the Key to Life, phosphorus is essential in maintaining and improving crop yields. Health, growth, life itself, would be impossible without phosphorus . . . so in a way these phosphate pebbles are more precious than gold.

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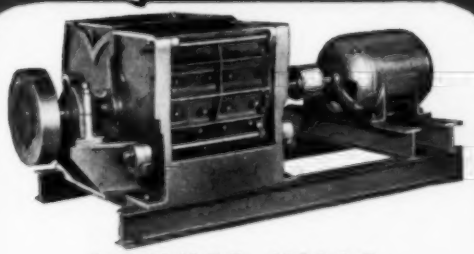

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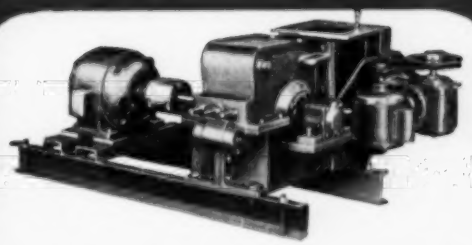

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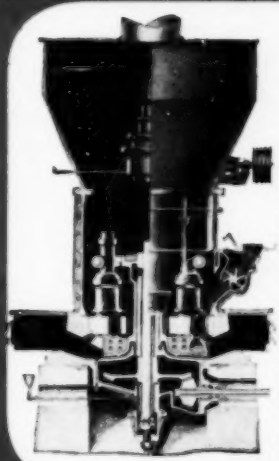

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For accurate, uniform pulverizing or blending. Instantly adjustable to finenesses down to 400 mesh, even micron sizes. Dries and grinds simultaneously. Automatic, self-adjusting feed. Many other exclusive engineering and construction features. Williams Roller Mills have set new standards for product quality, output and economy.

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BORON-HUNGRY ALFALFA...Dwarfed and puny, with yellow or reddened top leaves, stunted, with growing tips rosetted. When these symptoms appear, it's Nature's distress signal for a new supply of Boron.

TOP QUALITY ALFALFA...Fertilized with Boron, grows lush and strong...provides maximum yield with bigger profits. Vigorous growth, such as this, shades out weeds resulting in longer life stands.

Borated Fertilizers pay 3 ways on Alfalfa

1. **EXTRA YIELDS**—an extra ton of hay per acre.
2. **BETTER QUALITY**—hay that is extra-leafy and green.
3. **LONGER LIFE STANDS**—vigorous growth shades out weeds.

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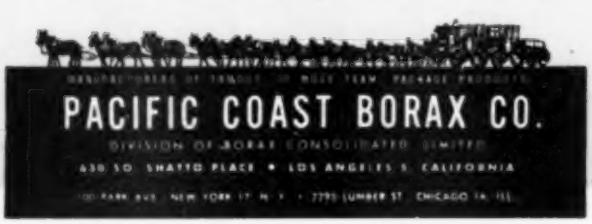

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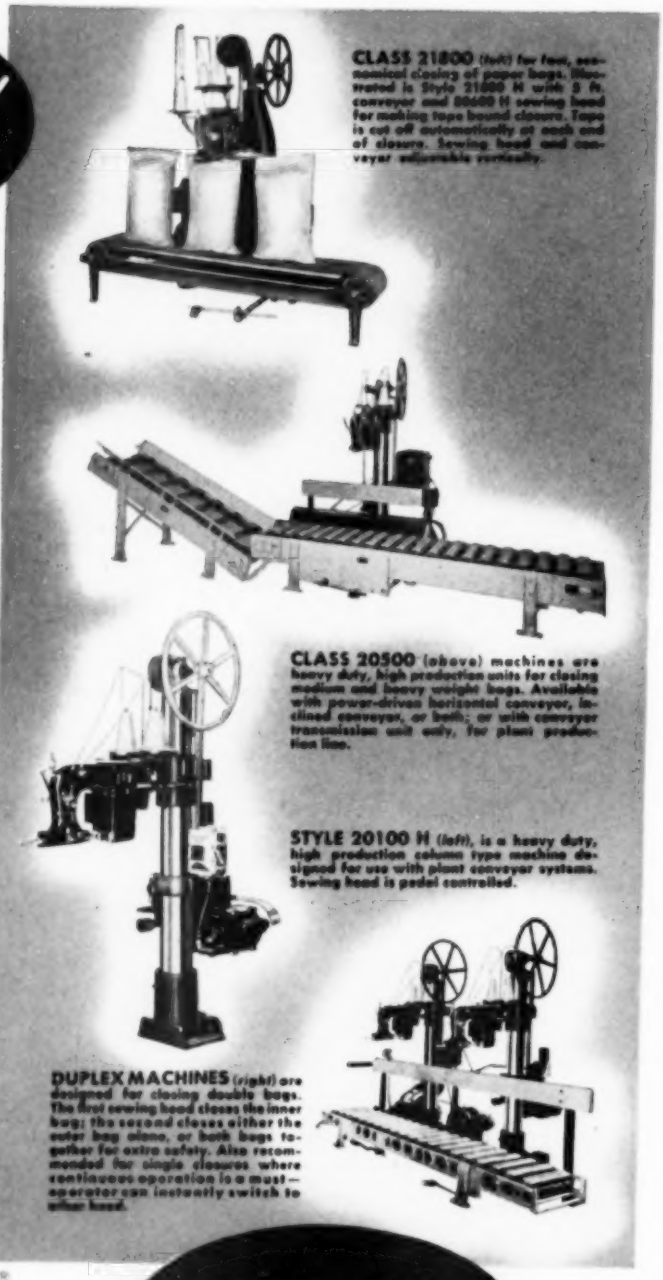

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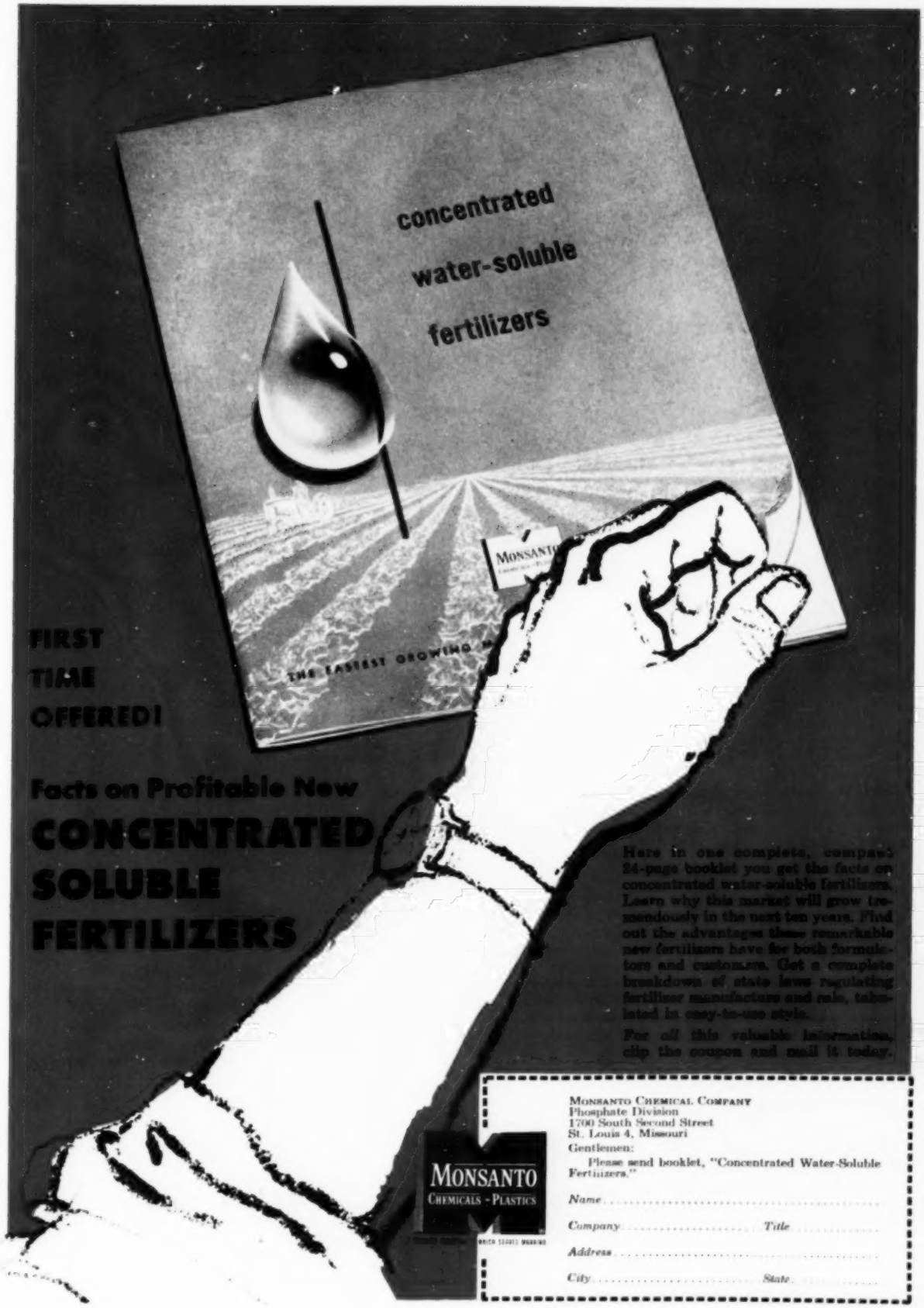
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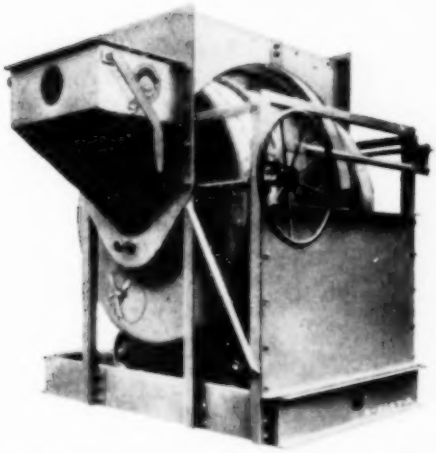

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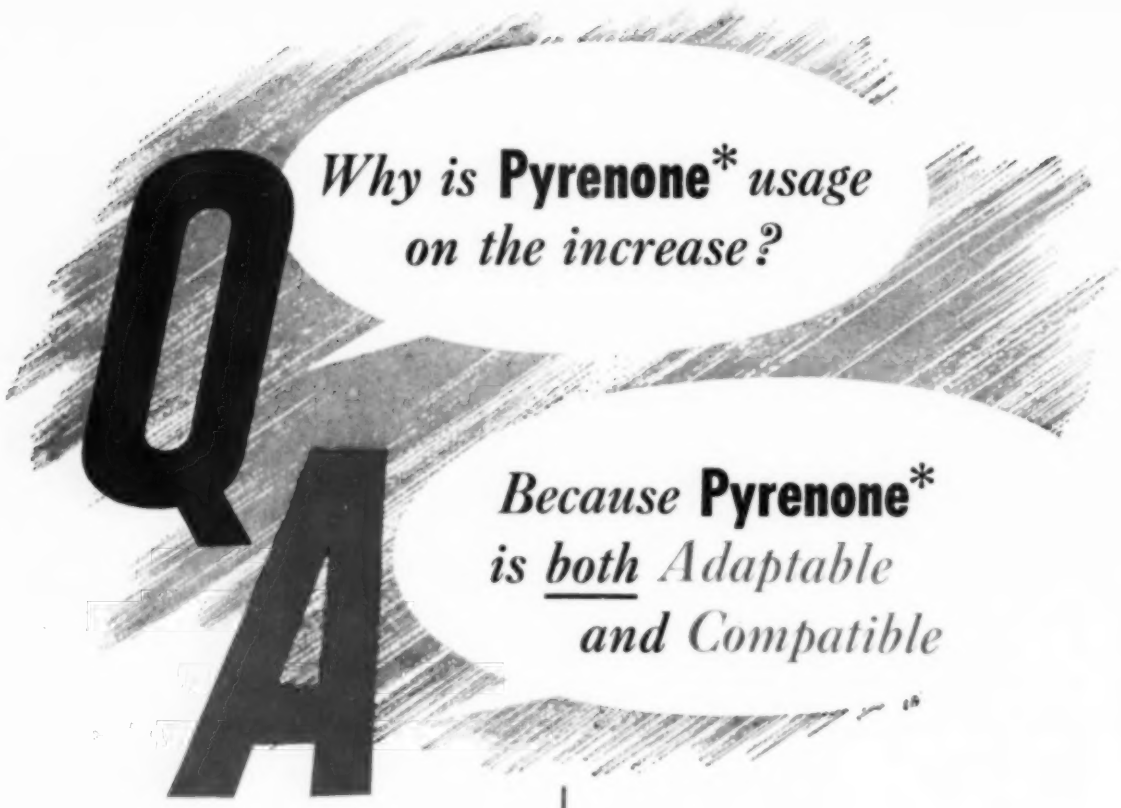

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Editorial COMMENTS

APPEARING before a subcommittee of the House Interstate and Foreign Commerce Committee recently, Lea S. Hitchner, executive secretary of the National Agricultural Chemicals Association told the legislators that H. R. 4277, otherwise known as the "Miller Bill" would correct many of the unsatisfactory provisions of the present Federal Food, Drug and Cosmetic Act. H.R. 4277 would substitute a more realistic and workable procedure for establishing tolerances than does the cumbersome procedure of the present law, he indicated.

Mr. Hitchner, speaking for the bulk of the agricultural chemicals industry, proposed certain amendments which have been suggested in consultations with entomologists, plant pathologists, chemists, Federal and State officials and industry committees. We think that the points were well taken.

In the first place, the new Bill recognizes that problems in the use of pesticides on food are much different than those with the use of intentional chemical additives. Thus, a separate section of the Act would relate to pesticides.

The new Bill also requires the *prompt* setting of tolerances for pesticides. Public hearings are eliminated and necessity for use of a pesticide is accomplished by certification by the Secretary of Agriculture to the Secretary of Health, Education and Welfare.

The introduction of a committee of qualified experts to advise and consult with the Secretary of Health, Education and Welfare in connection with tolerances, is provided for in the Bill. This modifies the power of life and death by one Government Agency.

A fourth point brought out by the NAC secretary is that a court of review is provided whereby the findings of the Secretary in connection with a tolerance, would be *evaluated* by the court instead of being the subject of rubber stamp as is involved in many appeal procedures.

Finally, provision is made for the tolerances which may result from the hearings of three years ago; also for the exemption of pesticides for which a tolerance is not necessary. Research would be protected and encouraged, he said and last, but far from least, is the fact that there could be a coordination of the Food, Drug and Cosmetic Act with the existing controls over pesticides under the Federal Insecticide, Fungicide and Rodenticide Act of 1947.

The Association should be commended for its strong stand in being insistent for more realistic legislation. It should be noted by the Congressmen of the subcommittee that the industry is not trying to avoid responsibilities, but is merely attempting to point out how unrealistic legal restrictions can damage severely the production of agricultural chemicals in the U. S.

Pesticides Play Important Role in Grain Elevator

Weevil Control

EMPLOYMENT of agricultural chemicals in meeting higher sanitation standards in grain storage and transportation is being emphasized on many fronts in the grain-growing regions of the U. S. The spot-light is on the country elevator, a key point in attaining higher standards, with operators learning practical and effective methods of making sure that grain not only comes to them in a clean condition, but that it remains uncontaminated while in their hands and leaves the elevator free from insects or other matter.

A recent series of demonstrations at four elevators in Oklahoma attracted some 200 elevator operators from the state. Major attention was given to inspection and cleaning elevators, together with emphasis on the use of chemical products to control infestations of rats and insects. Methods of determining weevil-infestation were demonstrated; among them being the "ferric nitrate" test. Through this simple test grain samples are placed in the solution. Sound kernels sink to the bottom while kernels containing weevils float on the surface. Despite a lack of official sanction for its precise accuracy, the ferric nitrate method of judging insect infestation does act as a reliable rule of thumb, as described in detail later in the article.

Also demonstrated at the meeting were methods for

Photos this page. Above: Despite efforts to keep grain clean in the bin, a dirty box car can cause loss of grade in transit. Checking a car for possible insect infestation, are Paul Jaggers (left), inspector, and Clyde Bower, director, Division of Entomology and Plant Industry, State Board of Agriculture, Oklahoma City.

Next picture: After railroad car has been vacuumed and swept out, insecticide with residual properties is sprayed inside the car and the walls lined with fresh paper. Tillman Zeigler, Dead Shot Chemical Co., Oklahoma City, sprays insecticide inside car at Farmers' Elevator, Kingfisher, Okla.

Lower photo: Insecticide spraying is not limited to box cars, of course. Here Mr. Zeigler applies methoxychlor to interior walls of the gallery and head house. (Note rat-bait station on the floor).

Photos this page: (Right) Making surrounding area difficult for rodents is part of job of maintaining clean grain in elevator. Jarvis Craig, Ford Termite Co., Enid, Okla. sprays CMU herbicide on weeds and grass which might harbor rats around elevator door. At right is Earl Carpenter, manager of the elevator.

Once each year, before harvest time, bins are emptied and vacuumed. Cracks and joints particularly.

After the grain bin has been cleaned thoroughly, a residual insecticide is applied with power equipment. Here Mr. Craig sprays a pathozychlor formulation.

Lower photo: Use of ferric nitrate solution to determine insect infestation in grain. Weevily kernels float on the surface of solution while sound kernels sink to the bottom.

determining the degree of infestation of rats and insects other than weevils.

Most grain contamination occurs after harvesting, since there are relatively few insects that infest grain in the field and most of these infestations are limited to local areas. Thus, after harvesting, the storage facilities on the farm must be kept free from contamination. Infested grain may be not only rejected, but even confiscated at any point in the marketing channel, thus lending importance to control measures from field to mill.

A Kansas survey lists numerous farm sites in addition to the granary where insects may find enough food to maintain themselves in large numbers ready to move to new grain. These places include combine hoppers, truck and wagon beds, barreled or sacked grain, hog feeders, mangers and feed boxes, corn cribs, hay mows, floor litter, storage pits, grinders, hammer mills, seed drills, and poultry houses, especially feed rooms.

A complete program of sanitation demands that all debris and old grain that might harbor insects should be cleaned up and burned, and the site should be sprayed with a good residual insecticide. (In farm storages, the loss due to insects is estimated to run as much as two per cent a month. This can mean loss of five million bushels a year on Kansas farms alone. In a year, stored wheat lost to insects throughout

the nation would fill the needs of 16 million persons. As much as five per cent of a year's wheat crop has been lost before it was entirely out of storage.)

Vigilance A Necessity

IF the grain has been kept free of insect and rat infestation up to the time it reaches the elevator, there are certain practices the operator of such can follow to see that the grain reaches the terminal without becoming infested. A thorough inspection of the bins themselves and the entire building may disclose sources of infestation which should be cleaned up before the new crop comes in.

A complete elevator clean-up program may include sweeping or vacuum-cleaning the entire building, insecticide spraying, elimination of rat harborages, rat-baiting and rat-proofing.

Cleaning the building requires some means of reaching from top to bottom of the bins. First the walls of the bins and the building itself should be thoroughly swept or vacuum-cleaned with careful attention to corners, ledges, cracks, supporting members and other places where old grain, dust and chaff may lodge.

After cleaning, walls should be sprayed inside the bins and throughout the building. Methoxychlor was the insecticide used in the Oklahoma demonstrations this year and in similar demonstrations in Iowa last year because of its combination of residual action and low toxicity. However, if inspection during storage discloses insect infestation, immediate fumigation is desired.

Weed Control Needed

WEED-SPRAYING outside the building is one of the new recommendations for eliminating rat harborages. "CMU" was used in Oklahoma. One cupful of this herbicide powder is sufficient to kill weeds and grass in 200 square feet for the entire growing season according to its makers. It is non-flammable, and a serious fire hazard may be eliminated once the weed growth is killed and cleared away. (Details of other recommendations for baiting and rat-proofing are available from the U. S. Fish and Wildlife Service.)

It should be remembered that box cars in which grain moves from country elevator to the terminal may also be a source of infestation.. They should be cleaned and sprayed like elevator bins, and then lined with fresh paper.

Need for a quick and practical test to determine infestation in grain has long been recognized by growers and handlers of grain. As mentioned earlier in this article, the ferric nitrate test presents a practical means of determination. A solution of two grams of hydrated ferric nitrate in 100 milliliters of distilled water is prepared . . . a formulation easily made by a druggist at a cost of something like 50 cents per gallon. A quarter-pint (half-cup) sample of wheat is placed in a pint of this solution. Then the pan is swirled for 30 seconds to wet the kernels thoroughly.* Weevily kernels float. Once they are distinguished from shrivelled kernels, they are easy to count.

(*Turn to Page* 115)

Both chemical and physical means must be used to keep grain and elevators free from contamination. At the left below, Tom Graham, Graham Pest Control Co., Oklahoma City, vacuums around outside of a bin at an elevator in Hobart, Okla. At the right, Mr. Zeigler, Mr. Graham and G. M. Douglas, superintendent of the elevator at Hobart, complete the job of ridding the area of all old grain.

* This test is described in detail in the 16-page circular EC-24 "Insect Control in the Country Wheat Elevator," published by the Bureau of Entomology and Plant Quarantine. Other official sources of information on insect control in grain storages include the illustrated Kansas report of farm conditions affecting insect infestation—(Kansas Agricultural Experiment Station Commercial Project No. 132); the "Memorandum of Understanding" of April 2, 1953, issued jointly by the U. S. Department of Agriculture and the Food and Drug Administration, and Farmers' Bulletin No. 2009, "Storage of Small Grains and Shelled Corn on the Farm." The Southwest Grain Sanitation Committee has also made a report on the problem. Details can be obtained from Jesse Smith of the Kansas Crop Improvement Assn., Manhattan.

A Close Partnership:

Phosphate, Fertilizer, and Agriculture

by

Vincent Sauchelli*

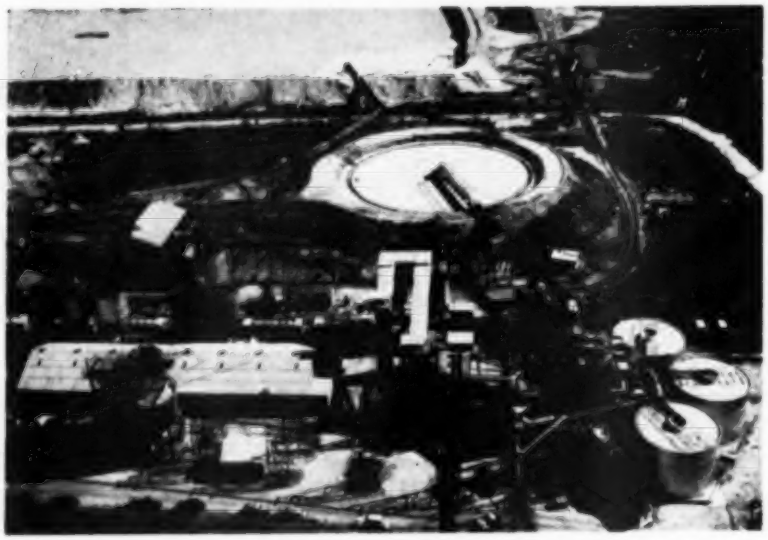
Director of Agricultural Research
Davison Chemical Corporation
Baltimore, Md.

AMERICA'S fertilizer industry is now in the process of rapid and extensive change involving both the product and the makeup of its membership. New kinds of fertilizer are appearing, quite different in physical appearance and chemical composition; corporate businesses having backgrounds remote from fertilizer manufacture are entering the industry. Formerly, the fertilizer industry expanded by doing the same things merely on a larger scale. Now, expansion is occurring through completely new kinds of operations based on chemical engineering and through the introduction of fertilizers into areas where until recently, they were hardly known. The fertilizer industry has come of age. It is now one of the most important divisions of the vast American chemical industry which excites the envy of the rest of the world. Last year, the fertilizer industry in the U. S. did a business of close to a billion dollars. By 1965, it is predicted, the industry will be doing close to two billion dollars annually. As might be expected, we are witness also to a new concept of fertilizer use: fertilizer is regarded no longer as a quick stimulant for bigger yields; but rather as a bulwark of permanent soil building and an indispensable tool in reducing the crop unit cost of production on modern, mechanized farms.

*Paper given at Regional Fertilizer Conference, Pullman, Washington, July 1, 1953.

Fertilizer Use Then & Now

THE fertilizer industry serves agriculture; and in turn, it is inevitable that developments in agriculture will strongly influence the industry. In the period preceding chemical fertilizer manufacture, guanos, farm manures, and by-products of the packing and other industries were generally used as plant foods — bulky organic substances like stable manure, fish meal, dried blood, composts and sewage sludge. Factory made fertilizers were dubbed "synthetic" or chemical salts, and even though derived from natural materials, were at first regarded by farmers with suspicion, prejudice and even contempt. This was understandable. Manures and guanos had been used for generations and were accepted traditionally. Fertilizers are strictly modern and, surprisingly, even at this late day, many farmers have never used them.



Aerial view of Davison's phosphate rock plant, Bartow, Florida. At left, center, is flotation plant; at lower left, the table plant; lower center, the washer plant; lower right, 40-ft. raw feed storage bins; upper center, 150-ft. hydro-separator. At extreme top is part of 400-acre settling pond.

The early bitter controversies over the use of fertilizers appear now as having been both futile and unnecessary. But 19th Century scientists were doughty warriors who loved a fight and many a battle royal was fought. Eventually, the Rothamsted Experiment Station in England and similar agricultural research institutions in Germany, France, and the United States demonstrated the value of so-called "artificial" or "chemical fertilizers" in the profitable production of crops, and peaceful development followed. However, even today the argument started by Liebig three generations ago when he declared that chemical fertilizers can furnish plants all the nutrients they need, is kept alive by the "organics only" cultists, who have never yet produced any acceptable evidence to justify their anti-fertilizer position.

However, the pressure of increasing population in all civilized countries and the unquestionable utility of chemical fertilizers in producing abundance of foods and fibers as demonstrated by American agriculture during the last war, have made many converts. All countries are in the process of expanding their domestic facilities for producing one or more fertilizer materials. Farmers everywhere are being taught how to use more lime and fertilizers efficiently by proper placement, better adapted ratios, and good soil management practices. The industrialization of the farm is demanding fertilizers of higher analysis and the improved drillability and storability qualities of granulated products.

Youth in the fertilizer industry of today can hardly appreciate the degree to which improvements in quality have been made. The sulfate of ammonia of yesteryear was almost always moist and liable to lump or cake, and its free acid rotted bags, corroded wooden or concrete floors and its tar acid impurities created unpleasant odors.

Superphosphate was formerly produced as a moist material averaging only about 12 to 14 percent P_2O_5. Prior to the use of mechanical dens, a trip to the superphosphate plant was a rather unpleasant experience — the fumes and dust were appalling. The potash salts have always been somewhat better in condition, but the original low-grade manure salts often gave trouble when compounded with other chemicals.

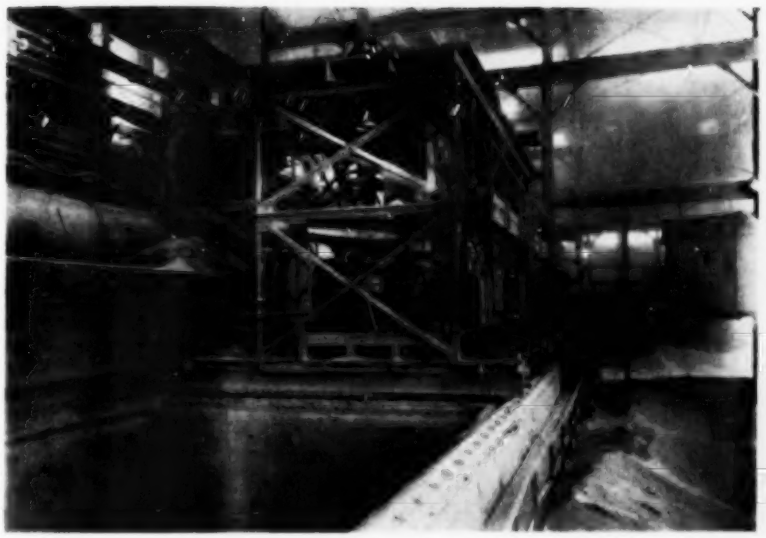
Standardization of analytical methods and the sale of fertilizers on a guaranteed basis were major improvements in the marketing of our products. Sales practices of the early days of the industry were reputedly on a low level. Many unscrupulous little peddlers sold mixtures on an unethical basis which tended to give the whole industry a bad reputation. Fertilizer people were often regarded as rogues or crooks; which explains why so many agricultural authorities of that period recommended that farmers buy their materials by analysis from reputable firms and mix their own fertilizers on the farm.

The enactment of fertilizer control laws by States had a wholesome effect on selling practices. Another significant factor in elevating the ethics and practices of the industry was undoubtedly the entrance into it of men of higher integrity and capabilities. This occurred when many of the smaller units became merged into large progressive enterprises. These larger corporations could afford to employ able executives, chemists, chemical engineers and other trained technicians. From then on, technological progress modified the character of the old-time scavenger industry.

Since World War I the American chemical industry has advanced by big strides. We see how this influenced the fertilizer industry:—the remarkable development of the synthetic nitrogen industry, our domestic potash industry, technological changes in the ancient superphosphate industry, physical improvements in such materials as sulfate of ammonia and imported nitrate of soda, the utilization of ammonia liquors of high nitrogen content which displaced low-analysis, uneconomical organic materials in mixed goods. When one considers the inertia which had to be overcome in the old tradition-ridden fertilizer and agricultural industries to get these innovations accepted, the progress since 1915 is truly marvellous.

Phosphorus and Phosphates

SINCE phosphorus is the major part of the subject being discussed, a brief review of some of the highlights of its history is pertinent. Discovered accidentally in the 17th century by the alchemist Brandt in Germany, phosphorus was destined to become one of the most remarkable discoveries of all time. This chance



Mixing platform where phosphate rock dust and acid are mixed and dropped into bin beneath it. At the right is a storage bin. This photo taken at Davison Chemical Corp., Curtis Bay Plant, Baltimore, Maryland.

discovery was transformed by slow, steady progress by the alchemy of vision, enterprise and sweat, into one of the primary materials for the advancement of agriculture, the improvement of private and public health and the enjoyment of human life. It is impossible to conceive of modern civilization in the absence of phosphorus. That's how vital the material is.

Early History

A DEBT of gratitude is owed to the pioneers who founded our industry and who patiently toiled to advance its interests — von Liebig in Germany, Gilbert and Lawes in England, Boussingault in France, William Davison, Gustavus Ober, John Kettlewell in Baltimore, Maryland — scientists and industrialists — and the thousands of unsung, unremembered persons who made their small but worthy contributions.

In the United States, commercial developments began with the discovery of phosphate rock deposits in South Carolina in 1867 and subsequent discovery and exploitation of the rich deposits of Florida and Tennessee. World agriculture as well as domestic, responded quickly to the availability of this essential plant nutrient. By 1900, about 80 companies were mining phosphate rock in Florida alone. In the last year of record—1951 — world production of phosphate rock amounted to 23.7 million tons with about 8 million tons of P_2O_5 and world production of superphosphate reached the grand total of 27.4 million tons (about 5 million tons P_2O_5) of which the United States alone produced 30 percent or close to 1.5 million tons P_2O_5.

The growth of the fertilizer industry had been relatively slow during its first 100 years. The pattern which developed in the early stages persisted until recently with but little change. Several of the larger fertilizer companies mined and beneficiated raw rock phosphate in Florida and Tennessee. These subsidiaries or mining divisions of the big companies furnished prepared ground rock to their parent companies and offered some for sale on the open market. Fertilizer companies, with one or two exceptions, manufactured superphosphate as the only fertilizer ingredient. Most of the large companies produced in coexistent plants all the sulfuric acid they needed, but the majority of the processors bought both rock and acid in the open market, while the dry mixers bought superphosphate from larger producers. Most fertilizer companies bought their requirements of the other major plant foods—nitrogen and potash — from prime producers and dry-mixed them with the superphosphate to produce complete mixed fertilizers. That, in general, was for years the broad pattern and organization of the fertilizer industry.

In today's technological civilization it seems to be the rule that search never ends for new and physical inventions. This is necessary for survival. The basic rule is to use energy more efficiently. Mechanization becomes the order of the day in this, the machine and chemical age. One major material invention can produce multiple effects; such as the invention of the internal combustion engine and its use in the automobile—myriad inventions and integrated developments are associated with that one invention. Similarly, a cluster of associated inventions and developments in agriculture and the processing industries stemmed from developments in the rock mining industry.

Phosphate Rock Mining

MUSCLE—human and animal—was the power used in rock mining in the primitive years in Florida and South Carolina — back-breaking work with pick and shovel, wheelbarrow and mule. Use of this same power prevailed in the fertilizer plants, too. What a contrast today! Giant draglines, equipped with booms 170 feet long and buckets which can remove 10 tons of overburden every 45 seconds of operating time—1500 tons an hour. And only 3 men required on a dragline per shift: To do the same work by the old muscle and steam shovel method required 40 men.

Beneficiation of the rock by flotation is another improvement in the achievement of low-cost operation. By its means, the miner can recover phosphate rock fines of less than 20-mesh size; fines which comprise about 20 percent of the total phosphate of lower grade rock of the pebble field of Florida (66 to 68% B.P.L.) and up to about 85 percent of the higher grades. Thus millions of tons of phosphate formerly discarded are now recoverable, representing real conservation.

Superphosphate Manufacture

WHAT is true of mining is true also of the processing phase of the industry. Technological progress in Europe and America has raised the general efficiency of plant operations, increased the total available P_2O_5 content and improved the physical quality of normal superphosphate. This product has been the basis of the world commercial fertilizer industry for more than a hundred years and is still the premier source of phosphoric acid for plant feeding purposes.

The process originated in England when John Lawes commercialized Liebig's suggestion that treating a mineral phosphate with acid converted it into a more rapidly available phosphate for plant growth. Lawes called the product Superphosphate and that designation has been used ever since.

This "wet" method of producing superphosphate has held first rank for over a century because of its simplicity and low-cost operation. Alternative methods are now receiving serious consideration owing to the threatened shortages of cheap sources of brimstone sulfur. The industry can take justifiable pride in its record of having improved manufacturing methods which gradually increased available P_2O_5 content from 12 percent to the present average of between 18 and 21 percent available P_2O_5. These are evidence of the improvements in the industry brought about by mechanization and chemical engineering. Technological advances have given granulation as a dependable means of improving physical quality and storability. The present capacity of the more than 204 plants in the United States for production of normal grades of super is close to 16 million tons (or about 3 million tons available P_2O_5) and of the 9 plants for concentrated grades, 45% to 48% P_2O_5, the national capacity is about 800,000 tons (approximately 360,000 tons P_2O_5).

Demand for concentrated superphosphates is expanding rapidly, particularly in the middlewest and Pacific regions. Industry is aware of this as is evidenced by the new capacity completed recently or at present under construction in Florida and elsewhere.

The trend toward mechanization and chemical engineering in all industry is reflected in the design and operation of modern superphosphate and fertilizer plants throughout the world. Mechanical dens for batch and continuous operation are now the general rule. Man-labor hours per ton of superphosphate have declined significantly while quality and quantity are maintained at high levels.

Sulfur Substitutes

THE threatened early depletion of the sulfur domes of the Gulf States, which alarmed many persons two years ago, had the effect of directing interest toward processes for calcining or fusing phosphates and processes that utilize nitric and phosphoric acids, alone or as mixtures. Europeans have for many years been acidulating phosphate rock with mixtures of nitric and sulfuric acids as a means of overcoming the high cost of imported sulfur. It is reasonable to expect that our domestic industry will in the near future utilize some of these alternative processes found suitable to our economy. Undoubtedly, we shall have in the not too distant future, commercial fertilizer materials of high nutrient content which now are known only to laboratory workers; for example, products such as potassium metaphosphate and magnesium ammonium phosphate. It is conceivable that low-cost electrical power may make it possible to produce the element phosphorus in the Northwest for shipment to eastern processing centers where it will be made into required phosphatic compounds for industry and agriculture.

The future appears so fascinating, but who dares to prophesy? Of one thing we can be sure: it will be different. Change is inevitable and we can face it with courage and hope.

Looking Forward

AGRICULTURE and the fertilizer industry constitute the closest kind of business partnership: no closer business partnership exists. The farmer's problems are the industry's problems. Its income depends upon farmers. Their purchasing power indicates the extent to which they may buy what our industry produces. To meet the demand of an expanding, scientific agriculture, industry has developed new and revamped old processes and techniques. Some of the novel developments are, for example: the direct application of anhydrous ammonia to soil; bulk spreading of superphosphate first and now complete fertilizers; spray-feeding through foliage; application of fertilizers by airplane; direct application of concentrated fertilizer solutions; use of pressure tanks for anhydrous ammonia application and non-corrosive tanks for ammonia solutions; and improved, moisture-proof bags.

Progress in the science of nutrition of plants and humans, the economic evaluation of balanced fertilizers based on agro-biologic sciences, new varieties of plants capable of utilizing much higher quantities of plant food than previous types—these are some of the factors favoring an increase in consumption of high-analysis, chemical fertilizers. These ferments in agriculture and the fertilizer industry are creating pressures within and without which demand action on the part of leaders if they wish to safeguard or improve their position. Something new has now been added: the federal government through the agencies of the Department of Agriculture, is prodding the industry to expand its facilities and urging cooperation of State agricultural agencies to meet the future requirements of our growing population. Production goals set up by the United States Department of Agriculture for plant nutrient production by 1955 call for an over-all increase of 79%, or in round numbers, an increase of total nutrients to 7,855,000 tons. This will cause the industry to raise its sights as never before. Our government is becoming our best salesman. Could any industry hope for more?

One may ask, in looking at this rosy picture of future prospects, "What can hold us back?" Actually,

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How much insecticidal material can be applied on forage crops without storage in animal fat? Cooperative tests by BEPQ—Texas and Oklahoma A & M Colleges produce significant information on

Meat Contamination from Pesticides

By H. V. Claborn, J. W. Bowers & R. W. Wells
U.S.D.A. Bureau of Entomology & Plant Quarantine

R. D.Radeleff & W. J. Nickerson
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SINCE chlorinated hydrocarbon insecticides are fat-soluble and are stored in the fat of livestock, such contamination occurs as a result of absorption of spray deposits through the skin or from ingestion of residues in feed. Studies on the contamination of meat by these materials when applied for livestock pest control have already been reported from the Kerrville experiment station (1, 4, 8).

It has been shown that insecticides used for the control of insects on forage crops are left as residues on livestock feed and this condition may result in meat contamination after the animals have eaten such forage.

Studies are in progress at the Kerrville, Texas, laboratory of the Bureau of Entomology and Plant Quarantine to determine the amount of these insecticides stored by sheep and calves when known amounts are added to the feed for prolonged periods.

The great variation in the amount of residues left on forage due to methods of application, growth rate, and weather conditions made it difficult to determine what concentrations of insecticides would be encountered normally on forage crops. We have therefore fed the insecticides at dosages that we considered would be maximum, and if the storage of an insecticide seemed excessive, have tested it at lower dosages.

The insecticides studied include DDT, methoxychlor, toxaphene, chlordane, BHC, dieldrin, and aldrin. The first studies covered a feeding period of only 4 weeks. Later, the time was extended to 8 weeks, and finally to 16 weeks, which was the period used in most of these studies. This is the maximum time that cattle and sheep would be kept on feed when they are finished for slaughter.

Preparation Feeding

THE insecticides used were dissolved in acetone in such concentrations that 1 ml. of solution was sufficient to contaminate 1 pound of feed to the desired degree. Each feeding was weighed and the insecticide added at the time of weighing.

The cattle were fed in individual stalls and were given all the feed they would eat twice daily. The sheep were grouped as ewes or wethers and fed as groups of two or three animals; otherwise the feeding was the same as for the cattle. The sheep were kept in small pens throughout the feeding period, but the cattle were allowed freedom in an exercise lot when not actually being fed.

Feed consisted of ground corn and oats, cottonseed meal, and chopped alfalfa hay. The hay was incorporated with the concentrate and fed as one mixture.

Weight, feed consumption, and efficiency of feed utilization were recorded along with clinical observations.

Fat samples were obtained

TABLE 1

Parts per million of aldrin, dieldrin, and chlordane stored in the fat of animals fed 25 p.p.m. of the insecticide in the diet.

Insecticide	Animals	Weeks feeding		Weeks after feeding ceased				
		4	8	4	8	20	32	36
Dieldrin	Steers	58	79	46	36	19	9	—
	Heifers	41	77	56	36	21	7	—
	Wethers	60	77	—	46	25	31	33
	Ewes	60	79	67	30	25	14	11
Aldrin	Steers	70	63	68	55	25	10	—
	Heifers	80	86	67	36	15	9	—
	Wethers	39	70	58	37	32	33	31
	Ewes	48	68	43	45	32	—	10
Chlordane	Steers	9	18	16	5	0	—	—
	Heifers	16	19	11	5	0	—	—
	Wethers	4	12	<4	—	—	—	—
	Ewes	11	13	<4	—	—	—	—

from the omentum at indicated intervals by the omentectomy technique described by Radeleff (9). This method has many advantages over the method of slaughtering for collection of a sample. It makes possible the collection of a fat sample from the same animal at repeated intervals, and permits following the level of an insecticide in the fat of an individual animal, thus eliminating the variation between animals.

The fat samples were placed in paper cartons and refrigerated at 0-5° C. until dehydrated, which required about 7 days. The dehydrated fat was weighed, cut into small pieces, placed in a blender with 125 ml. of the proper solvent, and blended for 2 minutes. Twenty grams of anhydrous sodium sulfate was added, and the mixture was blended for 1 minute longer. Then 1 gram of Filter Cel was added and mixed well, and the extract filtered. The blender and filter were washed with enough solvent to make a total volume of 200 ml. The filtered extracts were then variously treated for fat removal and analysis.

For DDT analyses chloroform was the solvent used in the extraction procedure described above. The removal of fat and determination of the insecticide were made by the method described by Schechter *et al.* (10).

For methoxychlor analyses n-hexane was the solvent used for the extraction. The fat was removed and the methoxychlor determined by the method of Claborn and Beckman (3).

For toxaphene, chlordane, dieldrin, aldrin, and BHC, benzene was the solvent used for the extraction. As no specific methods were available for determining these insecticides in fat, they were analyzed for organically bound chlorine by the method described by Carter (2), and the amounts of insecticides were calculated. When fat samples are properly dried, uncontaminated beef fat gives a blank that ranges from 0 to 2.5 p.p.m. of organic chlorine, which is within the experimental limits of the method. In all experiments, samples from the control animals did not exceed 2.5 p.p.m.

Feeding 25 ppm Insecticides

A GROUP of two calves and two sheep were fed a diet containing 25 p.p.m. of aldrin for 8 weeks; a second group were fed a diet containing the same dosage of dieldrin; and a third group were fed one containing the same dosage of chlordane. A fourth group was used for controls. Fat samples were taken from all animals before the feeding of the insecticides was begun, after 4 and 8 weeks' feeding, and 4, 8, 20, 32, and 36 weeks after the feeding was discontinued.

These fat samples were analyzed for organically bound chlorine and the amounts of insecticides calculated. Factors for conversion of organically bound chlorine to aldrin, dieldrin, and chlordane are 1.71, 1.79, and 1.44, respectively. Factors are derived from the theoretical amount of chlorine in the compounds. The samples taken from all the animals before the experiment, as well as the samples taken from the control animals during the experiment, were all negative. Results of the analyses of fat from the animals on the treated feed are given in Table 1.

This experiment has already been described in part (4), but at time of publication, the study on the duration of meat contamination had not been completed.

Feeding of 10 ppm

A GROUP of two calves and two sheep were fed for 4 weeks on a diet containing 10 p.p.m. of DDT; another group were fed a diet containing the same dosage of methoxychlor; and a third group were fed one containing the same dosage of toxaphene. A fourth group was used for controls. Fat samples were collected before the feeding of the insecticide was begun and at the end of the 4 weeks' feeding period.

A group of five calves and six sheep were fed a diet containing 10 p.p.m. of chlordane for 16 weeks, and a similar group were fed a diet containing 10 p.p.m. of aldrin. A third group was used for controls.

The average results of the analyses of these samples are reported in Table 2.

Another group of six sheep were fed a diet containing 5 p.p.m. of pure aldrin for 16 weeks. Six sheep and five calves were fed a diet containing 5 p.p.m. of technical aldrin for the same period. This technical product was stated by the manufacturer to contain 60 percent of pure aldrin, so that the dosage was equivalent to 3 p.p.m. of pure aldrin. This product was also stated to contain 10 percent of other chlorinated hydrocarbon compounds, which if capable of being stored in the fat would prohibit the use of the organic-chlorine method for the analysis of these samples. Fat samples were collected before the feeding was begun and after 4, 8, 12, and 16 weeks' feeding.

TABLE 2

Parts per million of insecticides in the fat of animals after they were fed for various periods on a diet containing the insecticide.

Insecticide	Animals	4 weeks	8 weeks	12 weeks	16 weeks
Dosage 10 p.p.m.	Calves	6.8	—	—	—
DDT	Sheep	3.1	—	—	—
Methoxychlor	Calves	0	—	—	—
	Sheep	0	—	—	—
Toxaphene	Calves	<4	—	—	—
	Sheep	<4	—	—	—
Chlordane	Calves	11	13	10	11
	Sheep	9	16	16	9
Aldrin	Calves	35	41	44	49
	Sheep	38	53	49	55
Dosage 5 p.p.m.					
Pure aldrin	Sheep	7	11	17	17
Technical aldrin	Calves	<4	7	13	10
	Sheep	<4	<4	7	10

All samples were analyzed by the organic-chlorine method. In addition, ten samples from the calves that were fed technical aldrin were sent to Y. P. Sun of Julius Hyman Division for analysis by a bioassay method.

The results of the fat analyses by the organic-chlorine method are given in Table 2. The results by the bioassay method were slightly higher than those obtained by the less sensitive and less specific organic-chlorine method. A comparison of the two methods did indicate, however, that aldrin was the only chlorine-containing compound in the technical aldrin that was stored in the fat, and the use of the organic-chlorine method does seem permissible.

Feeding of 100 ppm

SIX sheep and five calves were fed a diet containing 100 p.p.m. of toxaphene for 16 weeks; another group were fed a diet containing 25 p.p.m. of this insecticide; and a third similar group were fed a diet containing 100 p.p.m. of BHC. A fourth group was used for controls. Fat samples were taken before feeding of the insecticides was begun, and after 4, 8, 12, and 16 weeks' feeding. In order to study the duration of fat contamination, samples were also taken from the three groups of animals at intervals after the feeding was discontinued.

The fat samples were analyzed for organically bound chlorine and the insecticides calculated. The results, given in Table 3, are the averages of individual samples taken from three each of ewes, wethers, heifers, and steers.

Toxaphene Results

WHEN toxaphene was fed at a dosage of 100 p.p.m., the residue in the fat of sheep reached a level of 22 p.p.m. in 4 weeks, and there was no significant increase during the remainder of the 16 weeks' feeding period. After feeding of the insecticide was discontinued, the residue decreased about one-half in 4 weeks and was eliminated in 8 weeks. The same dosage fed to calves caused 33 p.p.m. to be stored in the fat at the end of 8 weeks, and the amount stored did not increase above the limit of experimental error during the remainder of the 16 weeks' period. After the feeding was discontinued, the residue decreased to about one-third in 4 weeks and was practically eliminated in 8 weeks.

The feeding of 25 p.p.m. of toxaphene for 16 weeks caused 7.5 p.p.m. to be stored in sheep and 11.5 p.p.m. in calves. From the elimination data it can be assumed that these small residues would be eliminated in 4 weeks.

The feeding of 10 p.p.m. of toxaphene for 4 weeks caused no detectable amount of storage in sheep or calves.

BHC Storage

THE feeding of 100 p.p.m. of BHC to sheep caused the insecticide to be stored in the sheep's fat to the extent of 120 p.p.m. after 8 weeks. There was no increase above the limit of experimental error during the remainder of the 6 weeks' period. After the feeding was discontinued, the residue decreased to 32 p.p.m. in 8 weeks and was practically eliminated in 16 weeks.

When the same dosage of BHC was fed to calves, the amount of insecticide stored in the fat continued to increase to the end of the feeding period, the final residue being 250 p.p.m. This residue decreased to 84 p.p.m. in 8 weeks and to 22 p.p.m. in 24 weeks after the feeding was discontinued.

Results with Aldrin

ALDRIN fed at a dosage of 25 p.p.m. to calves and sheep, brought a continuous increase in the amount of insecticide stored in the fat to the end of the 8 weeks' period. The maximum storage was 78 p.p.m. for both sheep and calves. After the feeding was discontinued, there was a gradual decrease in the residue in the calves to 8 p.p.m. in 32 weeks. Since the residue retained by the sheep after 32 weeks seemed excessively high, all the sheep in the group were slaughtered 4 weeks later in order to get larger and better fat samples for analysis. The analyses checked with the previous ones within the limits of experimental error.

The feeding of 10 p.p.m. of aldrin to sheep caused storage which amounted to 53 p.p.m. after 8 weeks, and did not increase above the limits of experimental error during the remainder of the 16 weeks' period. When the same dosage was fed to calves, the amount of insecticide stored in the fat increased gradually to the end of the feeding period. The final residue amounted to 49 p.p.m.

The feeding of 5 p.p.m. of aldrin to sheep caused the insecticide to be stored in the fat in an amount that increased to 17 p.p.m. in 12

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TABLE 3

Parts per million of insecticide stored in the fat of calves and sheep fed 25 or 100 p.p.m. of toxaphene or 100 p.p.m. of BHC in the diet.

Insecticide and dosage	Animals	Weeks feeding				Weeks after feeding ceased			
		4	8	12	16	4	8	16	24
Toxaphene 100 p.p.m.	Ewes	23	22	25	23	13	0	—	—
	Wethers	20	20	25	18	12	0	—	—
	Heifers	24	31	29	36	12	2	—	—
	Steers	27	35	36	39	14	3	—	—
25 p.p.m.	Ewes	1	1	2	10	—	—	—	—
	Wethers	2	2	4	5	—	—	—	—
	Heifers	2	5	9	14	—	—	—	—
	Steers	2	3	11	9	—	—	—	—
BHC 100 p.p.m.	Ewes	108	127	116	111	—	32	4	—
	Wethers	116	112	122	126	—	32	5	—
	Heifers	129	211	207	246	—	83	—	19
	Steers	185	235	266	253	—	85	—	25

A West Coast Observer Discusses the Use of

Fertilizer in California

by
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WORLD-WIDE use of commercial fertilizers is relatively new and is increasing in many areas as fertilizer technology moves ahead to give agriculture a better product to enhance crop yields. This development has gained particular momentum during the past decade, but the years preceding had seen much advancement, too. Actually, we have had commercial fertilizers not much longer than we have had the automobile.

Although in the middle of the 19th century German scientists discovered the process of treating organic material from slaughter houses and thus were enabled to build up soil productivity, it was only about 1900 that the use of chemicals for fertilization was really appreciated. Thus, in the past half century consumption of chemicals, plus organic materials, has helped the world's production of food to triple and quadruple with about the same amount of acreage and manual effort employed.

Today, in 1953, we are the possessors of a wide variety of chemical combinations of nitrogen, phosphorus and potash, which have contributed as much as any individual development to the high standard of living in the U. S. It has put into the farmer's hand a production tool enabling him to support three people, food-wise, where at the beginning of the century, he could have fed only one person in addition to himself.

In order of volume used in fertilizers, the following chemicals are important in production of food and fiber:

Sulphate of Ammonia
Ammonium Nitrate
Nitrate of Soda
Anhydrous Ammonia
Ammonia Solutions
Urea
Calcium Nitrate
Potassium Nitrate
—and various others of lesser importance.

The entire plant food industry has grown to very large proportions. Nearly 21 million tons of commercial fertilizers were consumed in the United States last year, according to the U. S. Department of Agriculture, and California accounted for more than 700,000 of these tons. Compare this figure to the less than 100,000 tons consumed in California in 1926! The value of fertilizers used in the U. S. last year was nearly a billion dollars which puts it definitely in the realm of big business.

One of the most significant trends in fertilizer consumption, outside of the west coast states, is the fact that fertilization of corn is accounting for increasing use of plant food. In 1940, consumption of fertilizer on corn was negligible. But during last year, in the midwestern states, corn alone has accounted for 10 to 15 percent of the nitrogen used in the nation. This has been made necessary by the widespread planting of hybrid corn which, because of its frequently tremendous yields of 100 bushels per acre, removes large amounts of plant food from the soil. This had made it necessary to replenish the nutrients so that prolific crops might be continued year after year.

For the past ten years, the fertilizer supply in general has been less than the demand. During the years after World War I, however, fertilizer was in such abundant supply that the industry was placed in a depressed position, with many of the basic manufacturers of nitrogen and phosphatic materials operating at a loss.

Use in California

OF greatest interest to any group in this area, is the growth, development, use, and possibly misconceptions as they apply to fertilizer in California. Basically speaking, California soils are of an alkaline base, and generally, nitrogen has been the plant food in greatest demand and has shown the best results. However, there is a decided place for phos-

*Based on talk before California Seed Association, March 5, 1953.

phorus and potash. Many of us in the industry have found that a combination of the three plant foods, nitrogen, phosphoric acid, and potash, works to very good effect.

Furthermore, general experience seems to show that the reaction of the three forms of nitrogen; that is, sulphate, nitrate, organic, together in the fertilizer bag and applied as one unit, causes a plant response much better than theoretically should be the case. During the war, our local allocation authorities decided we should be allowed only small amounts of phosphatic fertilizers in California. Accordingly, allocations from the War Production Board were infinitesimal. Unfortunately for the fertilizer program, California farmers demanded far greater quantities of phosphoric acid than the allocations called for. As a result, the fertilizer industry and the farmers were in a continual state of turmoil as far as supplies of phosphatic fertilizers were concerned.

Since the wraps have been taken off of phosphorus, California has shown a steady increase in phosphoric consumption, even though soil analyses show rather adequate supplies of phosphorus in the soil. The answer seems to be that the phosphorus in the soil is unavailable to the plants, while the phosphorus from superphosphate, or combinations of nitrogen and phosphate do greatly enhance the returns on certain crops.

To explain the problem, the statement is often made by fertilizer people "What we don't know about fertilizer is greater than all of the sum total of knowledge that we do have." In other words, conditions of soil, moisture, climate, and the myriad other conditions that affect an individual piece of soil, make it very difficult to determine just what plant food an individual piece of land may require. Therefore, when in doubt as what type of plant food to apply, a general rule of thumb is to give the plant a chance to choose from the various plant foods. A "full meal" rather than only one item is desirable.

Direct Application Methods

DURING the last fifteen years, the development of direct application to the soil of anhydrous ammonia and solutions, also liquid phosphoric acid, has been very marked. These materials are available one step back from the finished form of sulphate of ammonia and superphosphate. Consequently, if they can be applied properly, the cost per unit of plant food is less than in the form of sulphate of ammonia or superphosphate. California farmers and machinists, have developed applicators for direct application to the soil, and valves for the use of these materials in irrigation water. These mechanical developments, have caused this type of fertilizer use to increase by leaps and bounds.

There has also been a large development of this type of fertilizer application in the Missippi Delta area on cotton. Reports indicate that the fertilizer cost per acre of cotcon grown when this material is properly applied, can be greatly reduced over the cost of hard nitrogen. There are no large basic manufacturers of nitrogen in California, with the exception of the Shell Chemical Company. This has required the importation of other hard nitrogen in sizeable quantities from eastern sources. This situation, however, is being changed rapidly.

Plans are now in formation for the construction of two new nitrogen plants in California. Since gas or electric power is the main ingredient for the manufacture of synthetic nitrogen, and since we are now able to get gas in California from Texas rather advantageously, it is hoped that there may be additional facilities for nitrogen construction within the next few years. The price of nitrogen in California has generally, but not always, been based on the eastern market, plus freight to California.

Technology Advances

FERTILIZER technology does not stand still. Technically, the new development in California and in other parts of the United States, is pelleted fertilizer. Placement of fertilizer on the crops has been recognized for many years as of great importance. A lesser amount of fertilizer will do more work when placed properly in relation to the roots of the plant or the seed, but because of war restrictions, the solution of this problem has been slow in coming.

During the last two years great strides have been made in the manufacture of pelleted fertilizer, in both simple materials and complete mixes. Thus far, the pelleting operation has been quite costly and because the mixers in California do not sell any one particular item in large volume, development of pelleted fertilizer in form of mixes has not been rapid. We do not have an 8-8-4 or a 10-10-5 in large amounts.

During the last year two or three firms locally, namely, Best Fertilizers, Swift & Company, and one or two others, have come on the market with pelleted fertilizer. It is my belief that within the next three to five years 80 or 90% of all fertilizer of all kinds sold in California will be pelleted or granulated. Our own firm in Southern California has had quite good success in granulating mixtures with organic bases. It is my belief that a farmer can well afford to pay five or seven per cent more for pelleted fertilizer than for dusty fertilizer. By using material in this form, we do away with wind loss and are enabled to place the material just where the plant needs it.

Summing up, there is no business that appears to the writer to offer a better opportunity for expansion than the fertilizer business. As the soils are depleted, and as farmers become educated, it is very evident that in almost all instances, a dollar spent for fertilizer will return two or three dollars in increased production. We in the industry, as well as others in allied businesses, must understand the problems of proper types of materials to recommend, and have a fair understanding of what can be expected of the different types of materials offered. The development of fertiliza-

(*Turn to Page* 115)

20th Anniversary to be observed at September Meeting; Representatives of Government and Business slated to appear on 3-day program of

NAC

ARTHUR W. MOHR
President, NAC Association

MEETING plans for the 20th anniversary meeting of the National Agricultural Chemicals Association are complete, according to Lea S. Hitchner, executive secretary of the association. The meeting will be held at Spring Lake, N. J., September 9, 10, and 11, with headquarters at the Essex and Sussex Hotel. Additional facilities will be available at the Monmouth Hotel, the NAC advises.

Election of the officers and 3 members of the 15-member board of directors will be held during this meeting. Board members who have completed their terms are: W. C. Bennett, president of the Phelps Dodge Refining Corporation, New York; J. Hallam Boyd, executive vice-president, Commercial Chemical Company, Memphis, Tennessee; and Ernest Hart, executive vice-president of Food Machinery and Chemical Corporation, New York.

Throughout the meeting special observance of the 20th anniversary of the association will take place. The first day's agenda will be presided over by NAC vice-president Paul Mayfield, general manager of the Naval Stores Department, Hercules Powder Company, Wilmington, Delaware. The presidential address will be delivered by Arthur W. Mohr, president, California Spray-Chemical Corporation, Richmond, Calif., followed by a report of executive secretary, Lea S. Hitchner.

A discussion of the problems and relationships of the Food and Drug Administration to the industry and to the public will be presented by George P. Larrick, deputy commissioner of the FDA. In view of the establishment of tolerances and new legislation now pending, his talk is expected to be of major importance to those attending the 20th anniversary meeting of the Association.

J. Earl Coke, assistant secretary of the U. S. Department of Agriculture, will address the group during the first session. "This will supply the first opportunity for this association to hear an address by an official of the new administration," Mr. Hitchner stated. Brigadier General Joseph F. Battley, president of the National Paint, Varnish and Lacquer Associa-

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Association

PAUL MAYFIELD
Vice-president, NAC Assn.

tion will discuss some of the services that a trade association can bring to its members and to the public.

W. Raoul Allstetter, vice-president of the National Fertilizer Association, Washington, D. C., will point out some of the principles of merchandising chemicals for the American farmer.

The annual golf tournament is scheduled for Thursday afternoon.

Panel Appears Thursday

THE entire Thursday morning session will be devoted to a discussion of fertilizer-pesticides mixtures with a panel of experts to guide the discussion, Dr. L. Gordon Utter, Diamond Alkali Organic Chemicals Division, Inc., will be the presiding officer. The panel will be made up of: Dr. M. D. Farrar, Head, Department of Entomology, Clemson Agricultural College, Clemson, South Carolina; Dr. Rodney C. Berry, State Chemist, Virginia Department of Agriculture, Richmond, Virginia; Dr. C. C. Compton, Julius Hyman Division, Shell Chemical Corporation, Denver, Colorano; and Eugene Ordas, Head, Product Development Division, Velsicol Corporation, Chicago, Illinois.

One other panel member is to be selected. Association members will have the opportunity to participate in this discussion after brief, formal presentations by various members of the panel.

Friday's final session will be devoted largely to different phases of the marketing of pesticides and their uses, Mr. Hitchner advised. Richard O. White, chief of the registration section of the Insecticide Division, U. S. Department of Agriculture, will discuss some of the principal problems involved in the registration of pesticides. Some observations on the importance and place of fungicides in agricultural production will be made by Dr. George L. McNew, director of Boyce Thompson Institute, Yonkers, New York.

Following addresses by these speakers, members of the association will be given opportunity to present questions and suggestion to the NAC staff and counsel on any problem relating to association activities. The three-day meeting will close Friday afternoon.★★

HON. J. EARL COKE
Assistant Secretary U.S.D.A.

LEA S. HITCHNER
NAC Secretary to Report

W. R. ALLSTETTER
Talks on Merchandising

Consumption and Supply of

Phosphatic Feed Supplements

DEMAND for phosphatic feed supplements has increased rapidly during recent years. Prior to 1952, production scarcely kept pace with the increasing demand.

In 1951, the Department of Agriculture initiated a program under the provisions of the Defense Production Act of 1950 to increase the productive capacity for feed phosphates. The Defense Production Administration on August 5, 1952 issued Expansion Goal No. 149-A approving expansion of the feed phosphate production facilities by 125,000 annual tons of P_2O_5 or approximately 420,000 tons* of material containing 13% phosphorus (bone-meal equivalent) by July 1, 1954 over fiscal 1951 production. When this expansion program is completed the domestic facilities, plus normal imports, will be capable of supplying annually approximately 900,000 tons of phosphatic material for livestock and poultry feeding purposes.

The following firms, which, have or are in the process of installing facilities—either as new plants or as additions to existing facilities, are considered a part of the expansion program. Those producing di-calcium phosphate include American Agr. Chemical Co., Carteret, N. J.; Feed Products & Service Co., St. Louis, Mo.; Monsanto Chemical Co., Trenton, Mich.; Shea Chemical Co., Goodwin, Tenn.; Texas City Chemical Co., Texas City, Texas; and Victor Chemical Co., Chicago Heights, Ill.

Coronet Phosphate Co., Plant City, Fla., and Internat'l Minerals & Chem. Corp., Mulberry, Fla., produce defluorinated phosphate.

The combined annual capacity of the above facilities is approximately 420,000 tons, which will meet the goal approved by DPA.

THE phosphorus deficiency of feed stuffs has become more pronounced in recent years. This deficiency has been caused in part by increased production of livestock and poultry; decreased supply of animal tankage, meat scraps and fish meal; and the necessarily expanded use of oil-seed meal and forage with inadequate mineral content. For example, the phosphorus content of soybean meal is 0.6 to 0.7 percent, whereas tankage contains from three to five percent.

To convert our feed supply efficiently and economically into meat, dairy, and poultry products, proper mineral and other supplements must be provided. These supplements are vital to livestock and poultry production operations, and are important factors in providing the nation with an adequate food supply.

In preparing this report, members of the trade have been most cooperative in supplying data on production and distribution of phosphatic feed supplements. Assistance was also received from the Bureau of the Census, Department of Commerce, and the Bureau of Mines, Department of the Interior. All assistance is gratefully acknowledged by the author.

A substantial part of the scheduled expansion was installed in 1952 and the program is expected to be completed in 1953, ahead of schedule.

The increased productive capacity will be for di-calcium phosphate and defluorinated phosphate. The emphasis on the production of di-calcium phosphate has been influenced to some extent by the 70 percent increase since January, 1951 in the facilities to produce elemental phosphorus, and a softening of the industrial and military demands for elemental phosphorus.

Shipments of di-calcium phosphate from domestic production for feed supplement purposes increased from 58,000 tons in 1951 to 84,000 tons in 1952. Productive capacity will be available in 1953 to produce approximately three times the 1952 shipments.

An import duty of some 12½ percent advalorem was imposed on feed-grade di-calcium phosphate effective August 30, 1952. In spite of the imposition of the import duty, the material has continued to come into the country at a somewhat reduced rate and sell in competition with domestic materials. The above-normal imports during 1952 were partially due to a rush to get the material in ahead of the effective date of the import duty.

Raw rock phosphate, such as Curacao phosphate rock from the

*Unless otherwise specified, the tonnage figures given hereafter in this report are in terms of 2,000 pounds of material, containing 13% P (bonemeal equivalent).

by

J. N. Lowe

Member of Fertilizer Staff
Office of Materials and Facilities
Production and Marketing Administration
U. S. Department of Agriculture
Washington, D. C.

Netherlands Antilles, is imported free of duty under paragraph 1740 of the 1930 Tariff Act, and the Geneva Agreement on Tariff and Trade bound the United States to keep such products on the free import list for the life of the agreement. The imports of Curacao phosphate rock have increased gradually during the past few years, and it is expected that imports will continue at present or higher levels in the foreseeable future.

Requirements and Use

CONSUMPTION of phosphorus feed supplements, in 1950, according to the American Feed Manufacturers' Association, was estimated to be 455,000 tons of phosphatic material. Based on reports from the above association and producers of feed-grade phosphatic materials, the Department of Agriculture estimated the 1951 requirement to be 600,000 tons. The 1951 consumption was limited to the available supply which was reported to be approximately 470,000 tons.

Preliminary studies by the U. S. D. A. indicate that 1,000,000 tons of phosphatic supplements would be required to balance the diets of the present livestock population. This assumes that all farm animals would be fed sufficient phosphorus to balance their nutrition needs. However, if this tonnage of material were available, it is not likely that it would be purchased for feeding purposes within the immediate years ahead.

Based on present trends, the demand for phosphorus feed supplements is expected to increase at the rate of approximately 50,000 tons annually, until the nutritional requirements of the farm animals are met. The maintenance of the present trends will depend to a large extent upon the economic well-being of the livestock and poultry producers. Considering the 600,000 tons required in 1951 as a base, and 50,000 tons as the annual increment of increase necessary, the projected 1953 and 1955 requirements will be 700,000 and 800,000 tons respectively. A lag of one or two years may be expected, and a forceful sales and educational program will be required to bring the consumption more in line with nutrition needs.

The 1951 and 1952 consumption and the probable 1953 supply are shown in Table 1. The breakdown of the various materials shown in Table 1 does not reflect the requirements of the individual materials. This breakdown reflects the consumption and probable supply of the materials that will be available for feeding purposes. The supply is expected to equal or exceed demand during the next few years, unless the industrial and military demands for elemental phosphorus are stepped up to the point that di-calcium phosphate production is curtailed.

In view of available information regarding domestic production and imports of phosphatic feed supplements, it appears that the aggregate 1953 supply of all major types of feed-grade mineral compounds and material will be sufficient to meet forseeable demands.

TABLE 1

Consumption of Phosphatic Feed Supplements during Calendar Years 1951 and 1952 and the Estimated 1953 Available Supply

Material	1951 Consumption Tons 13% P Basis	1952 Consumption Tons 13% P Basis	1953[1] Estimated Supply Tons 13% P Basis
	(Bone-meal equivalent)		
Di-calcium Phosphate:			
Domestic Production	58,000	84,000	200,000
Imports	20,000	31,000	20,000
Defluorinated Phosphate	111,000	132,000	200,000
Bone Meal	120,000	100,000	100,000
Curacao Phosphate Rock	112,000	123,000	123,000
Colloidal Phosphate	40,000	45,000	45,000
Other[2]	9,000	15,000	12,000
Total	470,000	53,000	700,000

[1]Represents probable production based on prospective demands, and not the capacity to produce. Production in 1953 is expected to be held in line with actual demand.

[2]Includes such materials as bone char, monocalcium phosphate, di-sodium phosphate, and di-ammonium phosphate.

Note: Bone-meal equivalent (13% P) is based solely on total phosphorus content, and does not take into consideration variations in the biological availability of the phosphorus content of the material.

Two Production and Marketing Administration experts report on results of recent tests in which new methods are used to determine

Vapor Hazard of 2,4-D Esters

THE problem of volatility of esters of 2,4-dichlorophenoxyacetic acid (2,4-D) and/or 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) has become increasingly important during the past several years. Vapors of many ester formulations are hazardous in that they may injure susceptible crop plants as severely as would sprays applied to the plants themselves. It is well known that spray droplets drifting from a treated area to nearby plantings of susceptible plants will damage these plants.

This factor can, to some extent, be controlled by selecting a suitable nozzle to increase the coarseness of the spray. The hazard evidenced by ester vapors must not be confused with the injury possible with air-borne spray droplets. Injury from vapor is a distinct property of a formulation

IN THE ILLUSTRATIONS

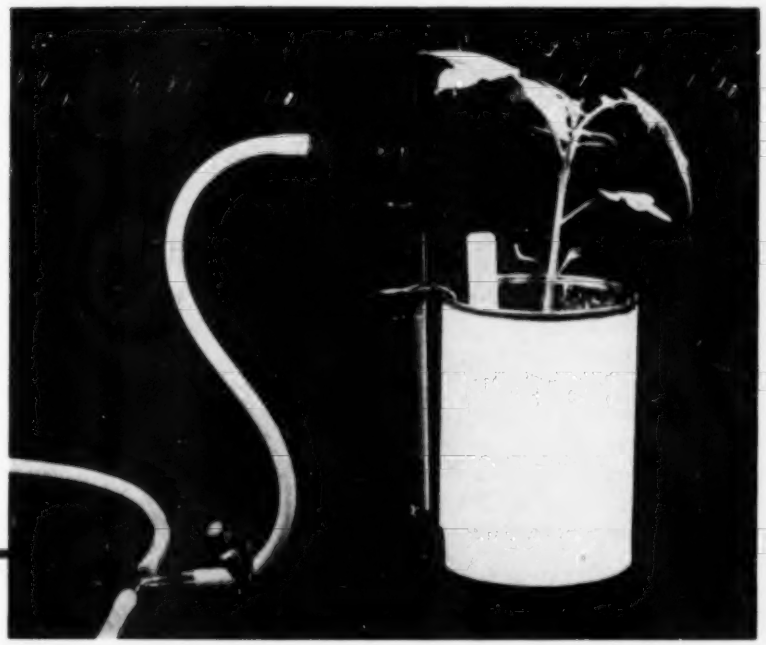
Top photograph: Rutgers tomato plants showing response to ester vapors and reaction classes ranging from 1 through 6.

Second shot: Response of Rutgers tomato plants 72 hours after exposure to an isopropyl ester of 2,4,5-T following vaporization via forced air stream for 2, 4, and 16 hours.

Bottom picture: Response of Rutgers tomato plants 72 hours after exposure to a propylene glycol butyl ether ester of 2,4,5-T following vaporization via forced air stream for 2, 4, and 16 hours. (Photos by E. P. Carter).

by
A. David Baskin
and
E. A. Walker

Pathologist and Chief of the Fungicide & Herbicide Section, respectively, Insecticide Division, Livestock Branch, Production and Marketing Adm. U. S. Department of Agriculture Washington, D. C.



Above photo: Unit of system with bag removed showing air-lead line to test tube containing an ester formulation and its position relative to the test plant.

and has been found to be severe in case of some esters and relatively insignificant in case of others, barring contamination during or after manufacture.

In accordance with the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act of 1947, labeling claims by manufacturers for performance of a herbicide must be truthful. To the Insecticide Division, Livestock Branch, Production and Marketing Administration, U. S. Department of Agriculture, has been delegated the responsibility of reviewing claims made in labeling so that the public will be protected from hazards that might attend the use of such economic poisons.

Relative to the problem of volatility of esters of 2,4-D and/or 2,4,5-T, the Insecticide Division attempted to clarify the concept of volatility as it applies to the subject esters, and to establish a method to measure those factors peculiar to ester volatility that would afford a scale of probable biological effects for commercial ester formulations. Only with a sound concept and a feasible method, can claims for volatility of these esters be evaluated.

Concept and Definition

THE understanding of "volatility" is all-too-generally restricted to the physico-chemical sense of the word. A volatile substance is commonly regarded as one which easily wastes away by evaporation, one which readily vaporizes as volatile oils or liquids. Numerous tests comparing the physiological response of young cotton to vapors from highly volatile compounds such as ether, alcohol, acetone, diethylamine and triethylamine, to ester formulations of 2,4-D and/or 2,4,5-T were consistent in their effects upon the test plants and demonstrated the need to supplement the above definition of "volatility" with a biological one.

A true concept of ester volatility must be applied to plant response and is therefore not contingent upon the rate of evaporation of any given formulation but rather on whether or not concentrations of the ester vapor (formative concentrations) are produced that would injure the test plants. Accordingly, it would be advantageous and is even necessary to include in the usual definition of "volatile" the term "formative concentration" which, ipso facto, implies a biological effect.

Hence, a volatile herbicide should be considered as one which upon vaporization produces a formative concentration of a physiologically active compound recognized in affected plants by such responses as epinasty (abnormal downward curvature of the leaves), leaf malformations, stem curvature, severe distortion, or any other manner of response directly attributable to the vapor from the chemical.

Proposed Biological Method

UNLIKE other known methods which depend on the evaporation of an ester in a closed system, the method we now use recognizes the importance of air turbulence in disseminating ester vapor and attempts to establish a standard for turbulence.

Material and Method: Pipette 10 ml. of the undiluted product to be tested into a 200 x 25 mm. Pyrex test tube fitted with a 2-hole No. 5 neoprene stopper. Into one hole place a right angle glass tube with 1 arm extending 50 mm. into the test tube. The outside arm of this tube is attached to the compressed air line with rubber tubing. Into the second hole of the stopper place a glass tube extending 5 mm. into the test tube and 50 mm. above the stopper. The

test tube, 2-hole stopper, and glass tubing coming in contact with the ester vapor should not be used again for herbicidal tests.

A wire ring around the test tube with a long stem pushed into the soil in the plant container serves to support the test tube alongside the test plant. (Rutgers tomatoes grown to 4 or 5 leaf stages.) Clean, 1 qt. oil cans with the tops cut away and several holes punched through the bottom are suitable disposable containers for growing the test plants.

A large paper sack (1/6-1/4 barrel size) is placed over the plant including the test tube. This size bag covers each unit of the system and *must* be replaced by a new bag for each exposure interval.

Several products can be tested simultaneously by splitting the main air line with a Y-tube and arranging T-tubes for air take-off to each of the test tubes. Adjustment of screw clamps (in place of screw clamps glass tubing with an appropriate capillary bore and of a length essential to provide a given rate of air flow, may be used) placed across the air line leading to the test tube immediately above the T-tube will provide an equal flow of air into each test tube. At the end of each of the 2 air line arms, bubble the air through 100 ml. water contained in 250 ml. Erlenmeyer flasks. An equal rate of bubbling in these 2 flasks will assure essentially equal rates of air flow through both arms.

Further, this arrangement circumvents variations in the air diaphragm-valve gauge because excess of air is expelled through the water and a desired volume is circulated through the test tube onto the plant. An air flow displacing approximately 750 ml. of water per minute at the terminal flask and by screw clamp adjustment, approximately 150 ml. water per minute when emerging from the test tube, has been found adequate.

In each exposure 10 ml. of a saturated aqueous sodium 2,4-D solution serves as a check. This solution must be included as a standard preparation and is compared in each test with a volatile ester (butyl 2,4-D) and a low volatile formulation (butoxyethanol 2,4-D).

Exposure intervals of 2, 4 and 16 hours at room temperatures (70-75° F) have afforded reproducible responses by Rutgers tomato plants to a variety of ester formulations. First observations are made at the time of removal of the plants from under the paper bag and at intervals of 24, 48 and 72 hours after the exposure.

Evaluation of volatility is made in terms of plant response, designated as 6 reaction classes. Thus (1) — no apparent response. (2) — epinasty 1-20° compared to normal, no curling. (3) — epinasty 21-40° compared to normal, slight curling. (4) — epinasty 41-60° compared to normal, moderate curling. (5) — epinasty 61-80° compared to normal, moderately severe curling. (6) — epinasty 81° to greater than 90°, severe formative effects apparent (twisting of main stem, distortion of petioles and leaflets). In this manner, plant response to ester vapor is based on epinasty and formative effects. Angles of epinasty are measured with a protractor.

Any given ester is tested for each of the three exposure intervals at least three successive times, a fresh 10 ml. aliquot of the undiluted product being used for every test. The product of the number of times (N) a reaction class (C) is obtained for each exposure interval (i) divided by the number of replications (r) constitutes the average response (R). Thus:

$$R_i = \frac{NC}{r}$$

A deviation of not more than one reaction class for successive tests at a given exposure interval would be tolerable in view of the fact that a high reading at one response might well overlap a low reading of the next higher response. In this case

$$R_i = \frac{N(C_1) + N(C_2)}{r}$$

Responses falling in classes 1-2 are considered to be low volatile esters and where these responses fall in classes 3-6, they are considered volatile esters for purpose of enforcement of the Federal Insecticide, Fungicide, and Rodenticide Act.

Based on results obtained from this test and information now available from research and private testing laboratories, low volatile ester preparations have been found to be the butoxyethanol, polypropylene glycol, tetrahydrofurfuryl, ethylene glycol butyl, propylene glycol butyl, polyethylene glycol, butoxy polypropylene glycol, butoxy ethoxy propyl and iso-octyl esters of 2,4-D and/or 2,4,5-T. Volatile esters have been found to be the methyl, ethyl, propyl, butyl, and amyl or pentyl series. We have found that each proprietary low volatile formulation should be tested for its activity, because difference in purity of components of commercial formulations is manifested.★★

Authors distinguish between hazard evidenced by ester vapors and that caused by air-borne spray-droplets. U.S.D.A. charged with responsibility of reviewing labeling claims so the public will be protected. Methods of testing include use of air turbulence to carry vapor.

The Chairman of House Committee on Agriculture presents his views on

Congress and Agricultural Policy

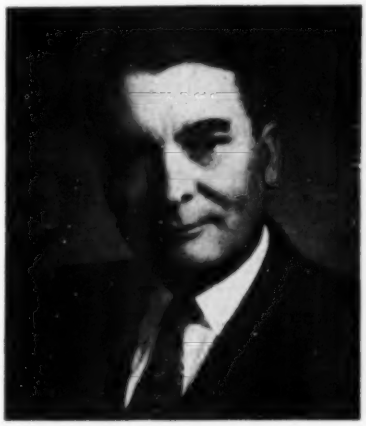
PART II

This is the final installment of Rep. Hope's article, taken from his address before the American Plant Food Council convention at the Homestead Hotel, Hot Springs, Va., June 11-13.—Ed.

by

Hon. Clifford R. Hope

Congressional Representative from Kansas
Chairman, House Committee on Agriculture
Washington, D. C.



WITH a new Administration and a new Congress, questions have been raised as to whether this means a change in our agricultural policies and programs. I do not see any reason for thinking there will be any marked change as to general agricultural policy. That will be determined in the main by our needs as a nation and certainly our needs at this time demand that we continue to increase our production in line with the demands which come from our increasing population and our position as a great world power. Furthermore, we know that this needed expansion of production cannot be made unless we give the farmer every possible assurance of stability of income at a fair level. I believe these objectives are generally accepted and have been for a number of years. The place where differences of opinion arise is on the question of methods and programs.

Stabilizing Farm Prices

DURING the last twenty-five or thirty years, much has been attempted in the field of giving farmers stability in the way of prices for the things they sell at a level commensurate with the prices of the things they buy. Everyone is familiar in a general way with those efforts. I shall take time now only to enumerate briefly some of the programs which have resulted either from Government encouragement or outright legislation.

Much has been done in the field of cooperative marketing although the hopes of advocates which were earlier held in this field have not been entirely realized. At one time it was thought that the volume of agricultural commodities marketed cooperatively might be sufficient to enable farmers through that method to have something to say about the price of their products. That objective has not been reached as far as any of the major crops are concerned although farmers' cooperatives have been successful in many lines and have rendered great service to farmers by bringing about better marketing conditions.

Another method which has been used — and quite successfully in the case of some commodities, particularly perishables — is that of marketing agreements. These agreements have been especially successful in connection with milk and some of the fruits and vegetables produced within small geographical areas.

The most extensive programs to stabilize agricultural prices have been in the field of price supports through Government loans and purchases. These efforts have included many commodities. Some of them have been successful and some not. The greatest success has been reached in dealing with the storable commodities, particularly the so-called basic commodities of wheat, cotton, corn, tobacco, rice and peanuts.

A special price support program tailored to meet the peculiar situation of the commodity in question is that which has been set up for sugar. It is possible that in the future we will resort more frequently to programs designed to meet such commodity situations.

All of the programs mentioned above, have been based primarily on the idea of adjusting production and marketing to consumptive demand. In some cases they have been called scarcity or curtailment programs but that is not an accurate description. Certainly the fact that our agricultural production has increased practically 40 percent during the time these programs have been in existence is a sufficient indication that our overall objective has not been the curtailment of production.

There has been criticism of government programs on the ground that there should be no control over the production or marketing of farm products. I think it should be pointed out, however, that farmers themselves have never objected too seriously to these provisions and that, generally speaking, compulsory controls cannot be established until they have been submitted to a vote on the part of the farmers affected and they do not go into effect unless two-thirds or more of those voting approve the program.

I am sure all farmers would prefer to get along without controls if possible but they know that the only way to prevent disastrous price drops is to hold production somewhere in line with demand. They also know that all efforts to do this by voluntary cooperation have failed due to the human element which leads some to cooperate and others to do just the opposite.

Of course, for the next two years the present price support program of 90 percent of parity on the basic commodities will be carried out. This was specifically pledged by the President during the campaign and Secretary Benson has stated the same thing on several occasions. Furthermore, there is only one way by which this 90 percent price support program for 1953 and 1954 can be changed and that is by Congress. Congress is not going to change it.

However, both Congress and the Department of Agriculture expect during this two-year period to carefully review and study all of our existing farm programs. This will be for the purpose of bringing them up to date and determining how well they meet present conditions and our requirements of the immediate future.

I know it is the position of Congress not to give up any farm program which is working reasonably well until and unless we find something better to take its place. Secretary Benson has made the same statement on more than one occasion.

I think everyone who has studied the matter realizes that it is impossible to make radical and sudden changes in our agricultural program without seriously affecting our agricultural economy and the economy of the whole nation. However, there are a number of proposals — some old and some new — which should be given consideration in connection with any study of our future agricultural programs.

Here are a few of the questions that I know we want to consider and probably everyone here could add something to the list.

First, we'll want to consider the question of the level at which prices should be supported. Then there has been a great deal of discussion of a two-price system, particularly for our export crops. That brings up the question of foreign trade generally. We have some crops which are dependent on export markets. Other agricultural products are sensitive to imports. That being the case, what can we do in our trade policies to reconcile these conflicts?

There is the troublesome question of perishable commodities. Is there any way of supporting them without involving losses such as have occurred with potatoes and butter?

Some people have proposed that we set up a system of price insurance based upon premiums to be paid by producers.

We will want to look into the question of how much could be accomplished by marketing research and to what extent we should encourage research to find new uses for farm products.

In the case of the storable commodities, we want to consider how large a supply of those commodities should be carried over from year to year.

All of those questions deal with the matter of stabilizing farm income at a fair level. There are just as many questions which arise in connection with the second aim of our agricultural policy, that is, bringing productivity in line with our future needs.

Some of those questions involve credit. Are existing sources of credit — both Government and private — adequate for present day farming? If not, what can be done?

Conservation looms large in the picture. We ought to study how our soil and water conservation programs should be improved. We may have to make some further decisions as to the agricultural conservation payment program. It connection with credit, it has been suggested that we have insured long-term loans for carrying out soil conservation practices. There is a great deal of interest in watershed programs. We have proposals pending in Congress for federal aid for those programs.

Then there is the matter of production research, including among other things more effective use of fertilizers. We need more soil research. Some of our soil scientists say we have only scratched the surface so far in our studies of this important subject.

Then there is the general question as to what extent we should expand research generally and how much should the Federal Government spend on this important subject.

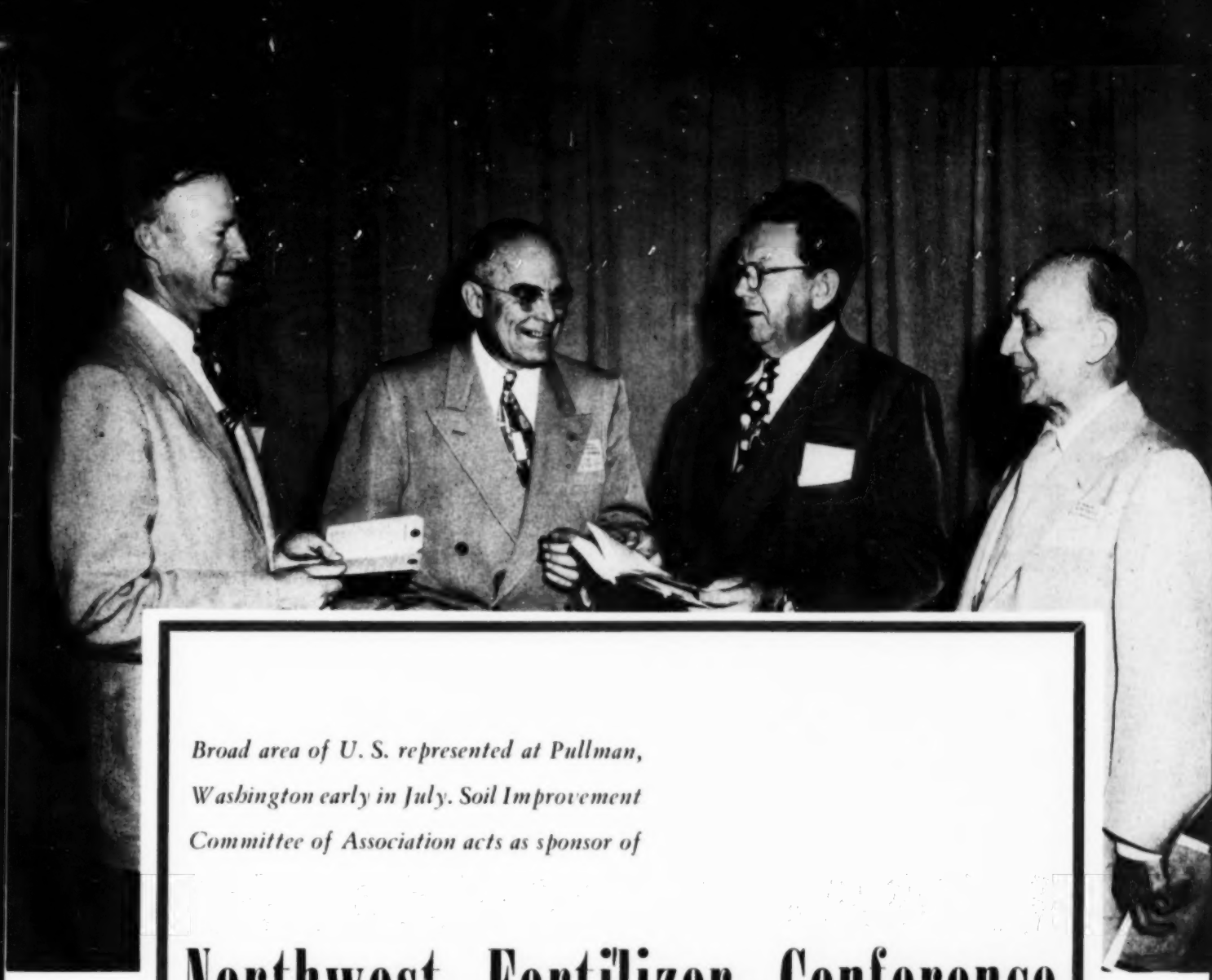
The House Committee on Agriculture will, during the coming months, endeavor to find the answers to these and other questions. In doing so, we want the help of everyone who is interested in agriculture.

We will hold hearings in Washington where we expect to listen to experts from the Department of Agriculture, from the farm organizations, our land grant colleges, and others. But we want to do more than that. We want to go out into the field and hold hearings in every part of the country so that farmers themselves will have an opportunity to present their views to the members of the Committee directly.

These hearings over the country are in accord with the ideas expressed by President Eisenhower during the campaign in which he placed particular stress upon the proposition of giving farmers a greater part in the formulation and administration of farm programs.

A further purpose of these hearings will be to acquaint all the members of the Committee with agricultural problems in every part of the country. All of the Committee members have a very good idea of agri-

(*Turn to Page* 123)



Broad area of U. S. represented at Pullman, Washington early in July. Soil Improvement Committee of Association acts as sponsor of

Northwest Fertilizer Conference

OVER three hundred people attended the Fourth Annual Regional Fertilizer Conference of the Pacific Northwest held at Washington State College, Pullman, June 30-July 2. Those in attendance came from the east coast to Hawaii and from Canada to southern California. A number of local scientists from colleges and experiment stations in Oregon, Washington, Idaho, and Utah participated in the program. The fertilizer industry in the same area was well represented on the program and in the audience.

National figures participating in the conference included W. R. Allstetter,, and Dr. Malcolm H. McVickar, vice-president, and agronomist, respectively, for the National Fertilizer Association, Wasington, D. C.; Dr. John R. Taylor, Jr., agronomist, American Plant Food Council, Inc., Washington, D. C.; Dr. George Scarseth, American Farm Research Association, Lafayette, Indiana; Dr. Eric Winters, TVA, Knoxville, Tennessee; and Dr. Vincent Sauchelli, the Davison Chemical Company, Baltimore, Maryland.

The Conference was sponsored by the Soil Improvement Committee of the Pacific Northwest Plant Food Association in cooperation with the

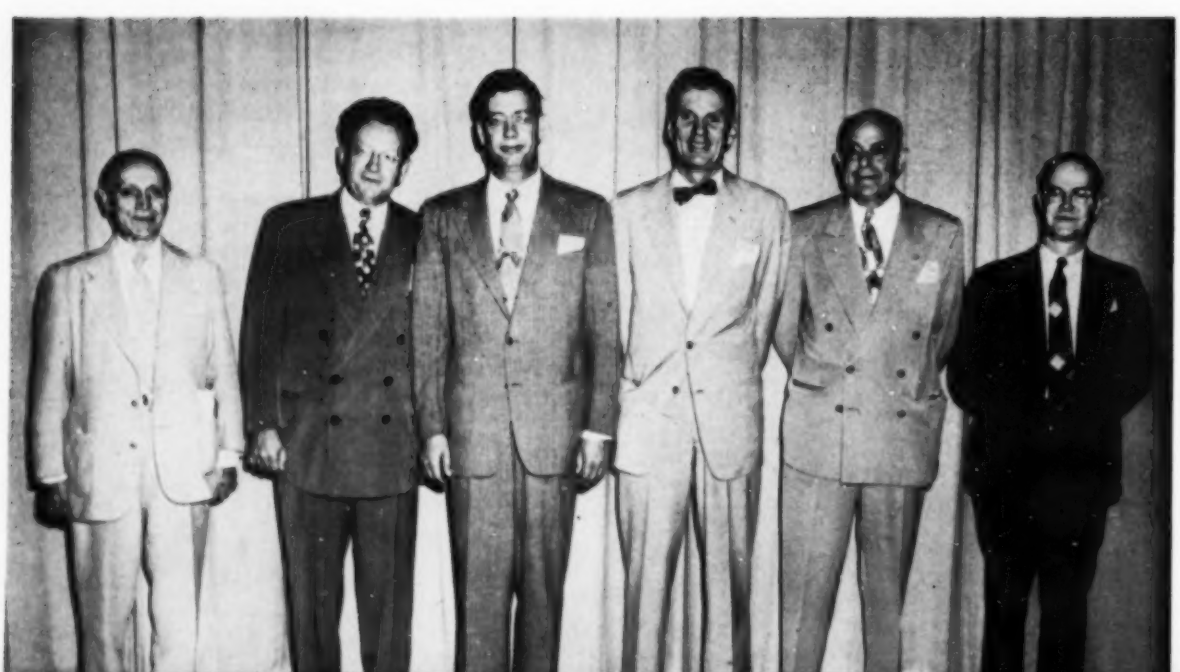
Photo above: Dr. B. R. Bertramson, chairman, Department of Agronomy, Washington State College, Pullman, chairman of the program committee, Pacific Northwest Regional Fertilizer Conference; Earle Shaw, Chilean Nitrate Sales Corporation; Dr. George Scarseth, American Farm Research Association; and Dr. Vincent Sauchelli, Davison Chemical Corp., Baltimore, Md.

agricultural colleges and universities of the Pacific Northwest. The program was designed to bring to those in attendance pertinent facts recently gleaned from research and the results of tested ideas. During the conference, scientists, extension and SCS specialists, and technicians and salesmen of the fertilizer industry evaluated these facts and ideas together, and exchanged viewpoints. The process of putting the new advances in soil fertility and fertilizer practices to work on the land, was thus expedited.

IN THE PHOTOS BELOW:

Top photo, left to right: Norman Hibbert, Anaconda Copper, vice-chairman of the Pacific Northwest Regional Fertilizer Conference; Todd Tremblay, Washington Farmers' Cooperative, new chairman of the Soil Improvement Committee; George Wickstrom, Northwest representative of the American Potash Institute; G. O. Baker, soil scientist, University of Idaho; and H. B. Cheny, head, soils department, Oregon State College, Corvallis, Ore. In the photo, Mr. Tremblay is being briefed on his new responsibilities as chairman of the important Soil Improvement Committee.

Lower photo: (L to R): Dr. Vincent Sauchelli, Davison Chemical Corp., Baltimore; Dr. George Scarseth, American Farm Research Association; Dr. Cheney; W. R. Allstetter, vice-president, National Fertilizer Association, Washington, D. C.; Earle Shaw, Chilean Nitrate Sales Corporation; and Dr. J. C. Wilcox, Experimental Station, at Summerland, Canada.



LISTENING *Post*

Test Fungicides For Pine Tree Disease

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

PITCH pine (*Pinus rigida*) is the most widely distributed conifer native to Pennsylvania, growing in every county of the state, according to C. L. Morris of the Pennsylvania Department of Forests and Waters. It has attained some commercial importance as a pulpwood and timber producer and has received attention in afforestation of waste banks after coal-stripping operations.

Needle browning of pitch pine is common throughout the natural range of the tree, but is especially prominent in plantations. The resulting loss of the food manufacturing ability of needles before the completion of their natural life span is a factor influencing the growth rate and vigor of the affected trees. The importance and possible control of the diseases causing early needle fall prompted this study.

Early browning of the needles of pitch pine in Pennsylvania is commonly caused by several agencies, including a needle-mining insect, *Exoteleia pinifoliella*, a needle rust fungus, *Coleosporium solidaginis*, and a needle cast fungus, *Hypoderma lethale*. Of these, the most important is needle cast or needle drop caused by *H. lethale*. Another fungus, *Lophodermium pinastri*, sometimes associated with needle cast of seedlings of various pines, was found fruiting on numerous occasions on fallen needles beneath trees in plantations and on scattered dead needles remaining on the trees but in most cases the browned needles on the tree had apparently been killed or weakened by attacks of the gall midge or other insects before invasion by *Lophodermium*.

To study the destructive needle disease caused by *H. lethale* and to determine if commercial sprays would control the fungus, an experimental area in a 3½-acre pitch pine plantation near Pine Grove Furnace in southeastern Pennsylvania was selected for observation and treatment. Trees in this plantation were 15 years old. This area and the trees selected for spraying were examined at intervals from April 1951 until December 1952.

Infection and Development

DURING the first week in May 1951 trees infected with *H. lethale* became conspicuous by the gradual browning of their foliage, which most commonly started at the tips of the needles and progressed towards the base. The browning progressed rapidly and by the middle of May the small shiny black, lens-shaped hysterothecia (fruiting bodies containing spores) were developing on the browned portion of the half-killed needles.

By June 1, the foliage of heavily infected trees appeared as if lightly scorched by fire, and these browned needles were almost covered with hysterothecia. At this time the new needles were just emerging. A June 8 examination showed the hysterothecia fully developed and containing mature ascospores, although still closed and not releasing any spores.

Three consecutive days of rain during the period June 8 to June 21 apparently were conducive to maximum spore discharge and subsequent infection of the newly emerging needles. By June 21, most of the fruiting bodies had split and few ascospores remained. Some spores are produced and probably discharged throughout the growing season, since mature spores were noted as late as September. However, heavy spore discharge during the period June 8 to June 21 was responsible for most of the infection on the new needles as evidenced on analyzing the spray control data (Table 1).

Spray Control Experiment

TWO fungicide spray materials were chosen for comparison of their ability to control needle cast caused by *H. lethale*. Both were mixed with water, and applied with a standard three-gallon hand pressure garden sprayer equipped with a fine spray nozzle.

"Puratized Agricultural Spray," an organic mercurial, was supplied for experimental purposes by the Gallowhur Chemical Corporation. The second fungicide was a fixed copper spray containing 12.75% metallic copper as basic copper sulfate.

Four individual trees were chosen every two weeks for spray treatment. Each tree selected during 1951 had over 50 percent of its needles infected with *H. lethale* during 1950. Two of the four trees were sprayed with "Puratized," each with a different concentration; the remaining two were treated similarly with the fixed copper fungicide. In general, the spray treatment of each

selected four-tree group was continued throughout the season as new groups of trees were added to the spray schedule at successive two-week periods. In order to determine the critical period of infection and degree of control during that period, several of the trees selected earliest were dropped from the spray schedule at various periods. Trees selected for spray treatment averaged 6 feet in height and required about 1½ quarts of spray solution for each treatment.

To increase the sticking properties, 5 cc. of U. S. Rubber Company's experimental fungicide sticker were added to each gallon of solution of "Puratized Agricultural Spray," and the same proportion of potassium oleate, a soap, was added to the fixed copper spray.

The experimental sticker was of little advantage since most of the latex it contained precipitated on addition to the spray solution. This separation may have been due to low temperatures to which the sticker was subjected on several occasions before use.

Visible fungicide residue from the copper spray on needles sprayed two weeks earlier was often noted. The residual effect of "Puratized," a colorless liquid, was difficult to gauge, but the excellent control obtained (Table 1) indicated that this property is good.

Heavy infection was noted on needles produced during 1950 on trees in the test area and examination of check trees indicated that the intensity of infection was equally heavy during the following year when spray tests were carried out. The same conditions applied to several other pitch pine plantations and to naturally seeded pines in other areas under casual observation during this period. In 1952, however, infection was considerably lighter. In the study area, there is some indication that the trees effectively protected by spray in 1951 were less heavily infected in 1952 than their unsprayed neighbors.

Observations extending over the two-year period 1951-52 indicate that it is difficult to predict the degree of infection to be expected from *H. lethale*. Infection apparently depends on favorable moisture and temperature conditions at a critical period in the early growing season when spores are mature and the newly developing needles are tender and susceptible to infection. Total monthly rainfall during the critical infection period (June in 1951) apparently was not a criterion.

TABLE 1

Results of spray experiments for control of pitch pine needle cast (Hypoderma lethale) Pennsylvania, 1951

Tree No.	Treatment: material and concentration per/100 gals. water	Period sprayed	No. of sprays	Control on sprayed needles[a]
1	Puratized 1 pt.	May 25 — Aug. 17	7	Excellent
2		June 8 — Aug. 17	6	Good
3		June 21 — Aug. 17	5	Poor
4		July 6 — Aug. 17	4	Poor
5		July 19 — Aug. 17	3	Poor
6	Puratized 2 pts.	May 25 — Aug. 17	7	Excellent
7		June 8 — July 6	3	Good
8		June 8 — June 21	2	Good
9		June 21 — Aug. 17	5	Good
10		July 6 — Aug. 3	3	Poor
11		July 19 — Aug. 17	3	Poor
12	Fixed copper 10 lbs.	May 25 — Aug. 17	7	Good
13		May 25 — Aug. 17	7	Fair
14		June 8 — Aug. 17	6	Fair to poor
15		June 21 — Aug. 17	5	Fair to poor
16		July 6 — Aug. 17	4	Poor
17		July 9 — Aug. 17	3	Poor
18	Fixed copper 16 lbs.	May 25 — Aug. 17	6	Excellent
19		June 8 — July 6	3	Good
20		June 21 only	1	Fair
21		July 6 — Aug. 3	3	Poor
22		July 19 — Aug. 17	3	Poor
23	Check — none			Over 60% of needles all check trees were infected with needle cast during 1951 spray period
24				
25				

[a]Based on observations April to November 1952.
[b]Excellent = less than 1% of sprayed needles with cast infection; good = 1%-5% infection; fair = 5%-15% infection; poor = over 15% infection. Percentage of infection was an estimate based on sampling of needles on four or five branches scattered throughout the crown of the sample trees.

Results of Spray Tests

RESULTS were noted as follows:

(1) Two fungicides tested under field conditions gave practically complete control of the needle cast fungus, *Hypoderma lethale*, on pitch pine.

(2) Both "Puratized Agricultural Spray" at the rate of one pint and two pints per hundred gallons of water and a fixed copper spray at the rate of 16 pounds per hundred gallons of water gave excellent control when applied at two-week intervals throughout the growing season.

(3) Although some infection of newly emerging needles apparently takes place throughout the growing season, observations during 1951 indicate that heaviest infection occurs within a relatively short period in late spring (the middle two weeks in

June). It is possible to obtain good control of the fungus by a few applications of a fungicide during this critical infection period. "Puratized Agricultural Spray" at the rate of two pints per hundred gallons of water during this period of heavy infection gave much better control of the fungus than did the fixed copper

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Insect Infestations Vary Across Country

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is connected with the Division of Insect Detection and Identification, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.

By Kelvin Dorward

THE alfalfa plant bug, first recorded in the United States at Ames, Iowa in 1929, has now been found in Delaware and Maryland. Adults of this insect were collected at lights near Glasgow and Newark, Delaware during June.

Occurrence of the sweetclover weevil in Idaho has been established for the first time. Specimens collected at Pocatello and Arco in 1950; at Hot Springs, Owyhee County, in 1951-52 and at Idaho Falls in 1953 have also been identified as this insect.

Japanese beetles were reported from a new area in Illinois about the middle of July. The infestation involved several farms in the vicinity of Sheldon, in the northeastern part of the State. Control measures were undertaken against this new infestation shortly after its discovery.

White-fringed beetles have now been found in Johnston County, North Carolina, Beaufort County, South Carolina, and Leake County, Mississippi. In Houston County, Alabama, two important infestations on agricultural land were found during the month of June. One infestation, 5 miles west of Dothan, Alabama, involved an area of 1,000 acres with corn, peanuts and cotton being damaged. The other infestation, 10 miles south of Dothan, was found in about 550 acres of cotton and peanuts.

The English grain aphid which caused serious damage to wheat in Illinois during early June, reached outbreak proportions in the Northwest during early July. Thousands of acres of spring wheat were infested in the Walla Walla area of Washington with populations of 100 or more aphids per head. General heavy infestations occurred in other eastern areas of this State and some spraying was done. Oregon reported unusual outbreak numbers on spring wheat in Sherman, Umatilla, Union and Baker Counties with populations reaching 125 per head. Excellent insecticidal control was obtained in this infestation. Predators and parasites were also prevalent. Infestations were general in northern wheat growing areas of Idaho, but populations were lower than in Washington and Oregon, averaging less than 25 to 30 aphids per head of wheat. Utah reported that populations were generally lower than normal in that State.

Louisiana had considerable trouble with the fall armyworm during July. Infestations, from light to extremely heavy, occurred throughout the state with damage being reported on young corn, rice, Sudan grass, cotton, pasture grasses, sugarcane and other crops. The attack was especially severe on lands that had been flooded earlier in the year. This insect also damaged grain and pastures in eastern Texas, rice in some fields in Arkansas, and millet and corn in some areas of Mississippi. Georgia, Tennessee and Illinois also reported infestations.

Cereal and Forage Insects

NO reports of unusually heavy infestations of first-generation European corn borer were entered in July. However, in Indiana, Illinois and Iowa, there may be a heavy second brood infestation in the making. This situation could develop in Indiana because of the large amount of late-planted corn. Borer survival has been relatively high in central Illinois, but, of course, weather conditions during the last half of the month will have a great bearing on development of the second generation. Iowa bases its outlook on the larvae population, which is the highest since 1949. Second brood infestations may occur in much of the Kansas corn planted late enough to escape the first brood.

Threatening infestations of range land grasshoppers in south central Colorado developed full potential about the first of July. Over one and one-half million acres of private range land were involved. Control operations capable of treating 300,000 acres of the heaviest infestation, before heavy egg deposition, began July 6. Heavy infestations of grasshoppers in pastures and croplands were reported from several areas.

Oklahoma reported heavy infestations in field margins in the eastern area with some movement into crops. Heavy, spotted damage occurred in many Missouri areas also, with feeding injury to corn noticeable in southeastern counties. Migrations into soybeans, corn, and other crops took place in some areas of Illinois and large numbers of the insects appeared, causing considerable damage on light soil areas in Wisconsin.

Spider Mites on Fruit

SPIDER mite build-up in orchards continued during July in many areas. New York State reported serious populations in some orchards. New Jersey and Delaware had heavy infestations with populations large enough in some orchards to cause severe injury unless controlled. The pest damaged apple foliage in all parts of Maryland. Heavy infestations

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Meeting Assembly pictured at Clemson.

Clemson College Host as

Southern Control Officials Meet

PARKS A. Yeats, Oklahoma City, Okla., was elected president of the Association of Southern Feed and Fertilizer Control Officials at the eleventh annual convention of the organization held at Clemson, S. C., June 22 and 23. Mr. Yeats succeeds J. J. Taylor of Tallahassee, Fla.

The association also elected E. A. Epps of Baton Rouge, La., vice-president, and renamed Bruce Poundstone of Lexington, Ky., secretary-treasurer. The three new members of the executive committee elected were Bruce D. Cloaninger of Clemson, S. C.; M. P. Etheredge of State College, Miss.; and N. L. Franklin of Richmond, Va.

With over 200 persons attending, the convention got underway Monday afternoon, June 22. Following the usual opening business, J. J. Taylor, state chemist, Florida Department of Agriculture, presented his presidential address, urging officials to take their responsibilities seriously. "I think we, as regulatory officials, should be constantly reevaluating our regulatory program to see if we are keeping abreast with the new discoveries in the nutrition field and new practices in the manufacturing field," he declared. "If we do not,

Control Officials at Clemson meeting: At the right is Parks A. Yeats, Oklahoma City, Okla., newly-elected president of the Southern Association. Others in the picture (L to R): E. A. Epps, Jr., Baton Rouge, La., vice-president; Bruce Poundstone, Lexington, Kentucky, secretary-treasurer; and Dr. J. J. Taylor, Tallahassee, Florida, retiring president.

we will find ourselves failing to perform the functions for which our departments were created.

"The regulatory official who has the most trouble in getting compliance with his laws and requests is the one who carries a chip on his shoulder or tries to push somebody around," he added.

In the first of three papers delivered at the Monday afternoon session, Dr. Webster Penergrass, extension agronomist, University of Tennessee, Knoxville, said that "Public Relations" is a job for everyone connected with a firm or department. Leading a discussion on "New Uses of Insecticides in Fertilizer and Soil Toxicity Studies," Dr. M. D. Farrar, recently named Dean of Agriculture, Clemson College, Clemson, S. C., presented the problems, the advantages and disadvantages, and the uses of such insecticides as chlordane, aldrin, DDT, and heptachlor. N. R. Page, associate agronomist, South Carolina Experiment Station, Clemson, in his paper on "Minor Elements, Availability and Residual Effects," said that the trace elements, such as boron, iron, zinc, copper, etc., were to the soil and plants, what vitamins were to nutrition in the early '30's.

The association held its annual banquet the evening of June 22. J. A. Rogers, director of public relations for Coker's Pedigreed Seed Co., Hartsville, S. C., in the principal address, told the delegates that "with all our progress during the 165 years of our history, America is still the land of opportunities. And nowhere is the future so bright and the opportunities so abundant as here in the South."

Mr. Rogers pointed out that in America's early history, 85 per cent of its population was rural, while 15 per cent was urban. But now, "'honest-to-goodness' producing farmers constitute about 10 per cent" of the population.

"But," he added, "it is significant that the population shift from rural to urban areas has brought with it no corresponding lessening of responsibility for production of those

(*Turn to Page* 121)

Fertilizer Safety Program Nearly Complete

WITH a record attendance expected at the annual fall meeting, the Fertilizer Section of the National Safety Conference is completing its program plans for the Chicago convention scheduled for October 19-23. Headquarters for the fertilizer meeting will be the Hotel Hamilton.

Among the features of the meeting will be a demonstration on the use of carbon dioxide in reducing hardened piles of fertilizer in storage, at the Chicago Heights plant of International Minerals & Chemical Corp. This demonstration, scheduled for October 22, will be sponsored by the Cardox Corp. Special buses will be used to transport the group to and from Chicago Heights.

Among the speakers slated to appear on the program are John E. Smith, Spencer Chemical Co., Kansas City, Mo., general chairman of the fertilizer safety section, who will present his annual report of progress. Dr. Neal Bowman, National Association of Manufacturers, noted lecturer and sales psychologist, will address the fertilizer group. His address is expected to bring out practical information based on his varied career as a shipping foreman, retail store manager, trade paper editor and a director of advertising and publicity.

Another prominent speaker, Dr. Stewart L. Rankin, will discuss "Safety—A Way of Life" and open discussion periods will be provided to cover case histories, investigations and measures to reduce the number and severity of accidents.

Curtis A. Cox, Virginia-Carolina Chemical Corp., Richmond, Va., will describe CO_2 blasting technique preceding Thursday morning's demonstration.

The program committee, headed by John E. Smith and comprised of Vernon S. Gornto, Smith-Douglass Co., Norfolk, Va. and Thomas J. Clarke, GLF, Ithaca, N. Y., expects to present a schedule of events useful to all members of the fertilizer manufacturing trade.

In all, six speakers will relate in detail, circumstances surrounding recent accidents in their plants. The talks will include information regarding the nature of the accident, its severity and its cost. In addition, each speaker will describe the subsequent investigation, pointing out by whom the investigation was made, what it disclosed, and steps taken to avoid repetition.

A question-and-answer session will enable those in the audience to ask speakers for further details or clarification of any point. The crowd will also be given an opportunity to tell about how similar accidents in fertilizer plants have been controlled.

The original six case histories will cover different types of accidents and are expected to help in the overall reduction of mishaps in the fertilizer industry.

•

Rohm & Haas Elects Haas

John C. Haas was recently elected a vice president and member of the executive committee of Rohm & Haas Company, manufacturers of chemicals, resins and plastics. He has been a director of the company since September 1948.

•

Amenta Heads Calif. Firm

Harry Amenta has been made president of the International Fertilizer & Feed Company, Bakersfield, California. The firm operates in nine counties throughout the Southern San Joaquin Valley and Imperial Valley.

Mr. Amenta pioneered in sun-drying of surplus potatoes in Kern County in 1944, and was formerly associated with the Di Giorgio Fruit Corp. in both Florida and California.

The International Fertilizer Co. and its various subsidiaries, manufacture feed, can and freeze citrus juices, delint cotton-planting seed and store commodities for both Government and private business, in addition to the firm's fertilizer activities.

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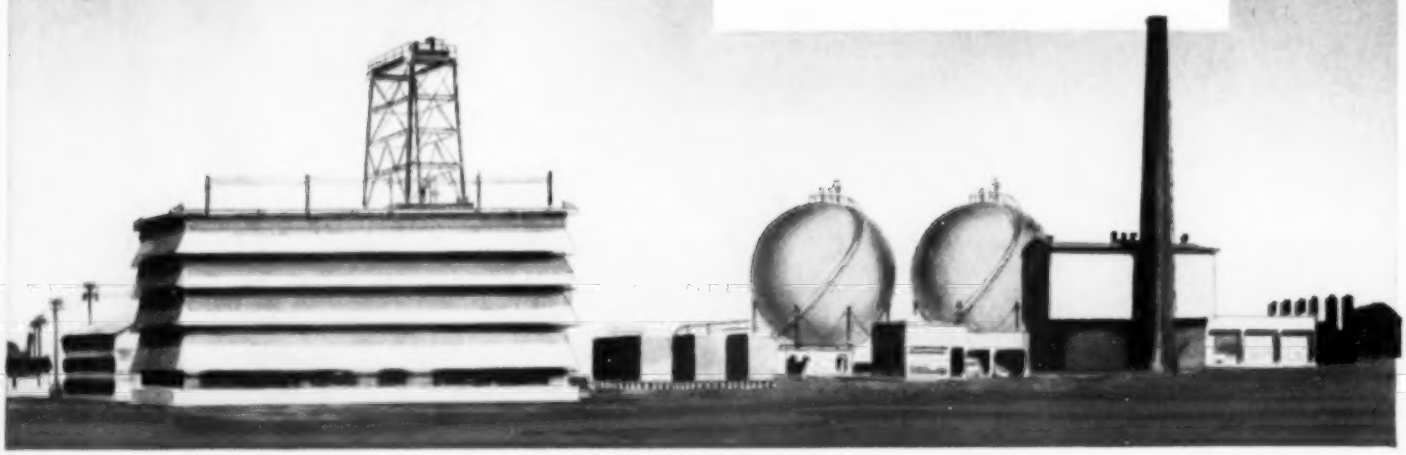

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CC-154

WASHINGTON Report

by
Donald G. Lerch
Cornwell, Inc., Washington, D. C.
(Agricultural Chemicals Washington Correspondent)

WITH the exception of objections raised by the Food and Drug Administration, there is almost unanimous acceptance among agricultural and industry leaders of the key sections of the Miller Pesticide Bill (HR 4277). Throughout the recent hearing by the O'Hara sub-committee of the House Interstate and Foreign Commerce Committee, witnesses were asked whether there was opposition to the Bill. There answers were a uniform "no" with a few qualifications generally considered to be of relative minor importance.

When asked by the Committee whether Grange members supported the Bill, J. T. Sanders, Grange legislative counsel replied, "yes ... furthermore no one to my knowledge has contacted the Grange with objections."

Truman Nold, executive secretary of the National Apple Institute, supported the Bill in essence adding that his members approved it and that he knew of no opposition in his field. When asked a similar question, John Riggle, secretary of the National Council of Farmer Cooperatives testified that after contacting their members all over the United States they not only supported the Bill but that none of their members had objected to it. Dr. H. H. Schwardt, speaking for C. E. F. Guterman, director of the Cornell Agricultural Experiment Station and on behalf of the Committee on Organization and Policy of Land Grant Colleges and Universities, strongly endorsed the Bill and upon questioning said the measure has the support of New York State farm groups and is unopposed.

* * * *

Congressman Miller (R-Neb.), sponsor of the bill, was not able to attend the hearing because of illness. However his reasons for advocating the measure were made a part of the record by Kimmon Karabatsos of Dr. Miller's staff, who is handling many phases of the Bill. Several members of Congress personally appeared in favor of the Bill.

* * * *

Lea S. Hitchner, executive secretary of the National Agricultural Chemicals Association, emphasized the importance of the Bill as it relates to the protection of health and provides encouragement to the pesticide industry to develop new products and uses for chemicals to assure continued abundant farm production. He stressed the safeguards to assure full consideration of health matters by leading authorities in government, colleges and industry.

"Provision is made for advisory committees composed of qualified experts to advise and consult with the Secretary of Health, Education and Welfare in connection with tolerances," he declared. "This avoids placing complete responsibility over highly technical questions of science in the province of one agency.", Mr. Hitchner added.

* * * *

The record of support for the Bill was further documented by testimony and the filing of statements by other agricultural agencies and farm leaders including the USDA, the American Farm Bureau and Samuel Fraser, executive vice-president, International Apple Association. In all, qualified observers indicate that this is one of the strongest cases built for an agricultural measure in recent years.

Secretary Hobby's list of 10 objections is not considered a serious roadblock by farm interests. They feel it is significant that Food and Drug witnesses appeared to concentrate their attack on "denovo" court hearings provided by the Bill which permits the court "either to affirm, modify or set aside the administrative order or direct this Department to modify or amend its order in conformity with the courts findings".

C. W. Crawford, Food and Drug Commissioner received Secretary Hobby's objections emphasizing that the Miller Bill would, in effect, reverse the Agency's policy that unnecessary poisons be barred from the nation's food supply. He further testified that the advisory committee seemed more like an arbitration board than a fact finding body.

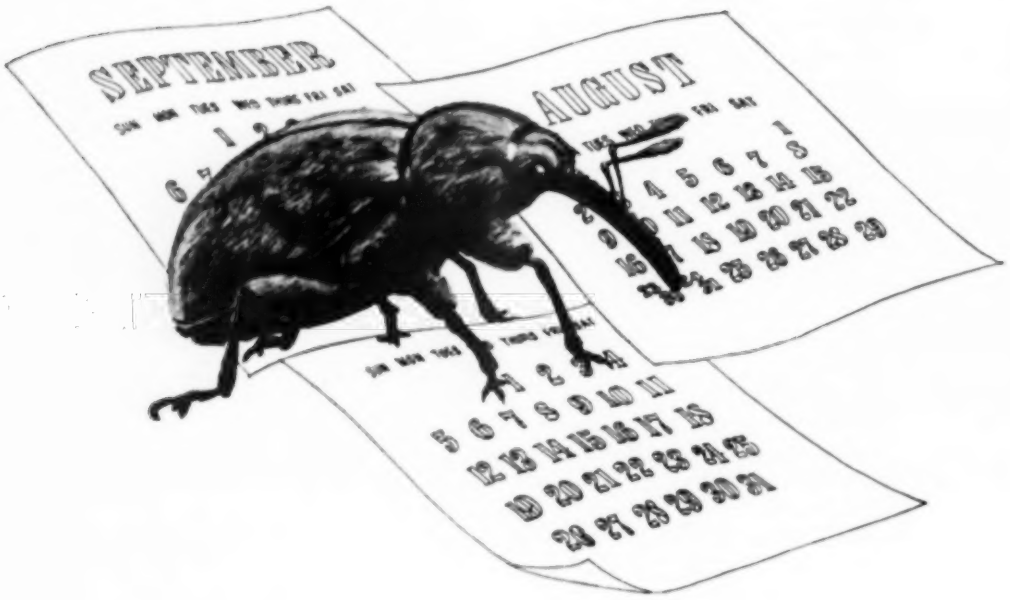
Those attending the hearing were impressed with the "change in atmosphere" over that which had prevailed when industry and farm witnesses had appeared before the Delaney Committee. The view that pesticides require special legislation and cannot be properly lumped in with general Food and Drug policy seemed to prevail. Industry witnesses were not subjected to sharp cross examinations.

* * * *

In response to a question by Congressman Wm. L. Springer, member of the Sub committee asking for a reason for the delay in issuance of residue tolorances, Commissioner C. W. Crawford replied in part, "I do not know how long it will take the Secretary's office to complete its review of this (tolerance) but presumably within the next few months a tentative order will be issued, the exceptions to it will be received and reviewed and a final order will be issued and I would hope that we might have a final order out before the beginning of the next growing season, that of 1954."

It thus appeared that Food and Drug is aware of mounting criticism for its continued delay in issuing residue tolerances.

BENZENE HEXACHLORIDE
(technical)



it's later than you think!

It's dry today. But what about tomorrow? If sudden rain should bring sudden infestation . . . and sudden, mounting demand for "3-5-40" dust, are you prepared to meet it?

"3-5-40" compounded of 3% gamma BHC, 5% DDT and 40% finely ground sulfur is the largest selling cotton insecticide in use today. Its action is fast, thorough, economical. "3-5-40" kills *all* major cotton pests. Controls the boll weevil, bollworm and pink bollworm, the cotton leafworm, aphid and flea hopper, the tarnished and rapid plant bug, Southern green stink bug, red spider mite, the grasshopper, thrip, garden cutworm and Fall army worm.

Today, tomorrow, next week *you* may be needing "3-5-40". When you do, Ethyl can ship BHC to you fast. Our new plant at Baton Rouge, Louisiana is only hours away by rail or motor freight. But why wait for demand you know is coming? Call, write or wire Ethyl and order your BHC *today*. It's later than you think.

ETHYL CORPORATION

Chemicals for industry & agriculture

100 PARK AVENUE, NEW YORK 17, N.Y.

ATLANTA, BATON ROUGE, CHICAGO, DALLAS, DAYTON, DENVER, DETROIT, HOUSTON, KANSAS CITY, LOS ANGELES, NEW ORLEANS, PHILADELPHIA, PITTSBURGH, SALT LAKE CITY, SAN FRANCISCO, SEATTLE, TULSA, MEXICO CITY AND (ETHYL ANTIKNOCK, LTD.) TORONTO.

A show down battle is brewing as the military insists on quick delivery of increased amounts of nitrogen. All nitrogen producers are of course willing to assume their responsibility in supplying government needs. The difficulty comes from different interpretations of how the government should take its requirements.

One view is that needs should be divided across the board in accordance with the production history of a manufacturing plant. This is the policy guiding nitrogen procurement at least through August. It is considered significant that the recent Commerce Department announcement refused to state what method would be used thereafter.

The opposing view among nitrogen producers is that the government should exercise its option and take its full requirements from so-called "leased plants" of which there are three. While this is the off season, supplies of some nitrogen materials are tight. It may be some time before the situation is resolved.

* * * *

More research will be needed to increase "our lead" over insects, according to Dr. Edward F. Knipling, newly-appointed head of entomological research and assistant chief of BEPQ who recently succeeded Dr. Fred C. Bishopp. He believes we can hold our own against insects but to make progress will be increasingly difficult.

In reviewing the scope of his new work for agricultural chemicals Dr. Knipling emphasized the need for more fundamental research and a better balance between basic development and applied studies. He lauded the co-operation among scientists in industry, colleges and the Bureau, adding, "It is my belief that this co-operation will continue to grow and new records of accomplishment made for the benefit of farmers and the public".

Dr. Knipling sounded the warning that the continuing intensification of agriculture with higher yields per unit makes conditions more favorable for insects. He feels this is a challenge to scientists to keep pace with the rapid changes in farm practices. We need to learn more about control of insects through use of parasites and predators in his opinion to obtain the most effective control.

* * * *

The development of low cost materials and improved methods of application is seen as a major stride during the past decade. Developing materials for insect control in forest land demonstrates the wide variance of crops upon which insecticides can be used with substantial return.

Commenting on the problem of resistance of insects to some insecticides, Dr. Knipling believes progress is being made to remedy the problem. Apparently some existing studies show promise, however, he believes more chemicals will cause resistance in the future and so increased research is needed.

* * * *

Dr. Arthur W. Lindquist will soon be handling full responsibilities in BE PQ's division of insects affecting man and animals as he succeeds Dr. Knipling.

Dr. Lindquist has been in charge of the division's laboratory in Corvallis, Oregon, for several years. He will approach his new position with wide experience gained in part at the Orlando Laboratory where he has participated in work on mosquito control and early experiments with DDT. He is one of the first scientists to have used radio-active isotopes in experiments with chemicals and "tagged insects."

In his new work, Dr. Lindquist will be in charge of the three division laboratories including those just mentioned and the station at Kerrville, Texas.

* * * *

Starting with a membership of but 4 companies 20 years ago, The National Agricultural Chemicals Association now has 140 members. This ten fold increase shows in part the tremendous growth of the industry during this period. During this time pesticide production has increased more than four-fold.

Under the guidance of Lea S. Hitchner, first president and executive secretary during this time, the Association and industry have "grown up". Hence the Annual meeting at Spring Lake, New Jersey (Sept. 9-11) takes on added significance.

In addition to recognition of the 20th anniversary, it will be the first time members hear from government leaders of the other party. Hitchner believes one of the highlights will be addresses of several leading figures in the new Republican Administration. Complete program is carried elsewhere in this issue.

Eugene P. Reagan, a plant quarantine official of the U. S. Department of Agriculture since 1929, is the new assistant chief in charge of regulatory activities of BEPQ. His appointment fills a post vacant since the late S. A. Rohwer transferred from the Bureau in December, 1950.

In his new job, Mr. Reagan will be responsible for the administration and enforcement of Federal plant quarantine legislation that protects this country from the entry of destructive insects or plant diseases, and retards or prevents the movement of such pests already established in limited areas of the United States. His authority will encompass all plant quarantine stations in the United States and its possessions.★★

* * * *

THE SUIT BEING BROUGHT against Henry A. Dreer Co., Philadelphia, by the Federal Trade Commission has been dropped. The FTC had charged "false and misleading advertising" to the company in connection with the firm's marketing of "Fluffium", a soil conditioner. The suit was dropped upon recommendation of examiner W. L. Pack who pointed out that since the issuance of the original complaint, the Dreer company had become bankrupt and its assets had been acquired by Suppiee-Biddle-Steltz Co.

•

NIAGARA CHEMICAL DIVISION, Food Machinery & Chemical Corp., New York, has appointed Larry G. Mayne purchasing agent for the company. Mr. Mayne was formerly in charge of export sales, according to J. V. Vernon, Niagara Division president and vice-president of FMC. The new purchasing agent joined the company in 1947.

•

MATHIESON CHEMICAL CORP., Baltimore, has announced the completion of its new hydrazine plant at Lake Charles, La. Among other applications, the chemical is used in the fields of insecticides and plant growth retardants, the company says.

DOW

CHEMICAL CURING GIVES MAXIMUM SEED RECOVERY

DOW GENERAL WEED KILLER acts as artificial frost on alfalfa, flax, soybeans and clover crops . . . allows direct combining

Preharvest treatment of alfalfa with Dow General Weed Killer permits combining direct from the stand.

Preharvest spraying has proved to be a money-making practice in saving large quantities of seed that might otherwise be lost by shattering and by conventional harvesting methods. The use of Dow's excellent *dinitro* formulation, Dow General Weed Killer, on alfalfa and all types of clover crops, flax and soybeans kills broad-leafed weeds and annual grasses—promotes uniform drying and allows direct combining. This gives maximum seed recovery, proved by many official trials and widespread commercial application. Spraying with Dow General Weed Killer at about the time mowing and windrowing would begin enables the grower to pick his own time for combining with the assurance of recovering a greater percentage of the seed produced. Dow General Weed Killer is put on by air or ground equipment. Thorough coverage is important.

Dow sales and technical men are available to work with persons responsible for recommending agricultural chemicals. Call the nearest Dow sales office or write to Midland. THE DOW CHEMICAL COMPANY, *Agricultural Chemical Department*, Midland, Michigan. In Canada: Dow Chemical of Canada, Limited, Toronto, Canada.

you can depend on DOW AGRICULTURAL CHEMICALS

DOW

Through the SIFTER...

IMMEDIATELY following next month's meeting of the N.A.C.A., Paul Mayfield, vice-president of the association, general manager of the Naval Stores Department of Hercules Powder Co., and one of the industry's more youthful grandfathers, will go back to college. Paul is scheduled to enter Harvard for one of those three month courses to which many progressive companies are exposing some of their top executive personnel. The purpose, they tell us, is not to acquire the broad Harvard "AAAAH", but rather to get up to date on how companies should be run, and markets developed. Look for a big spurt in toxaphene sales in '54.

* * * *

Every time we have occasion to use the association initials, as above, we come smack against the question once more as to whether it is properly N.A.C.A., the style which we normally follow, or N.A.C., which the association itself seems to favor. Apparently they avoid the final "A." to avoid confusing the ag chemical association with at least three other groups which use the initials "NACA" for their designations. These three include the National Association of Cost Accountants, the National Armored Car Association and the National Advisory Committee for Aeronautics.

* * * *

The Pacific Branch of the E.S.A., having just elected Art Lindquist of the Corvallis headquarters of B.E.P.Q. as its chairman-elect for the coming year, must now take early steps to name a successor. As noted elsewhere in this issue, Dr. Lindquist has been transferred to Washington to succeed Dr. E. F. Knipling as leader of the Division of Insects Affecting Man and Animals in the B. E. P. Q. Maybe the Pacific branch can break out another "13-day wonder" certificate like the one presented to Charlie Palm at the recent Lake Tahoe meeting to celebrate his brief tenure as the final president of the A. A. E. E.

* * * *

We just finished pulling the switch on National City Bank for what we suspected was the invention of a prosperous operator of an insecticide business. Television viewers around New York have perhaps seen the commercial, repeated periodically on their nightly news broadcasts, which showed a couple ex GI's, looking very trim and prosperous, who had started an insecticide business on a loan made to them by the same generous Natl. City Bank. We figured the yarn strictly legit, and started to pry into names, location of plant, etc., so we could run a human interest story in Ag Chem. Back comes a letter from NCB declining to furnish any details, and recently this particular commercial has dropped out of the nightly round. Makes us think that perhaps these characters and this particular insecticide business were just dreamed up by some writer like ourselves, — or perhaps the once prosperous ex-GI's have gone busted this season trying to make a buck out of DDT.

* * * *

While on this ominous note of vanishing profits and pulled in horns, we might pass along the item that Chemical Corporation of Colorado, Denver who issued promissory notes to creditors early this year, in a reorganization move, are currently offering to exchange these promissory notes for preferred stock. The company reports its operations so far this season have resulted in a small profit, the first since August, 1951, but such profit is not sufficient to meet the scheduled payments due on notes which were to have been made in August. Faced with this situation, the company has made the proposal to replace the outstanding notes with 6% cumulative preferred stock. They indicate that if this proposal is unacceptible to note holders, the only other course will be to liquidate the business.

* * * *

Interesting experiments are being conducted at Beltsville, Md., by the U. S. Department of Agriculture, on various soil conditioners. Dr. R. E. Wester, Associate Horticulturist invites readers of *Agricultural Chemicals* to visit the plots in which tomatoes, lima beans, carrots and beets are being grown.

The conditioners are being used on Beltsville Silt Loam, a problem soil which packs and sticks together after each rain. Dr. Wester says that three soil conditioners are being tested at present. They are:

(1) "VAMA," partial calcium salt of vinyl acetate-maleic acid co-polymer

(2) "HPAN," sodium salt of hydrolyzed polyacrylonitrile

(4) "CMC," sodium carboxymethylcellulose.

Both Dr. Wester, author of "Effect of Soil Conditioners on Crop Yield" which appeared in our July issue and Dr. Homer T. Hopkins are available at the plots to answer questions regarding effect of the materials on physical condition of the soil and on response of vegetable crops.

•

New Hose Resists Ammonia

B. F. Goodrich Co. has developed a new type of hose for handling anhydrous ammonia, the company has announced. A special rubber compound used in the hose tube is said to resist liquid and gaseous ammonia which permeates ordinary rubber compounds quickly.

Since pure ammonia gas must be kept under pressure at all times to maintain its liquid state, the new hose is designed for a minimum burst pressure of 1750 pounds per square inch. The hose is used to transfer the liquid gas from bulk storage plant to tank truck, to consumers' storage tanks and from them to the dispensing equipment.

•

Bradley Puverizer VP Dies

William A. Gibson, 68, managing director of Bradley Pulverizer Co., Allentown, Pa., for the past 43 years, died July 27. He was well known to the agricultural limestone trade and took active part in numerous civic affairs in Allentown.

THE NEW AND IMPROVED RODENTICIDE

With its release for general sale on March 24, 1953, Pival moved from a promising experimental project to a full fledged commercial product backed by a year of comprehensive field and laboratory testing.

So here it is—the new anti-coagulant rodenticide you have heard so much about—ready to take its place in the list of new and improved tools for the pest control industry.

More than just another rat and mouse killer, Pival combines its effective killing power with three other and exclusive characteristics.

Tops in acceptability—On free feeding tests against a leading anti-coagulant rodenticide, Pival corn meal baits have shown substantially greater acceptability—an important plus in achieving effective control.

Resistance to insect infestation—Extensive laboratory tests of Pival's insecticidal action have demonstrated that, even under conditions of severe exposure, specially prepared Pival cereal baits are far less subject to insect infestation—an important plus in bait storage and in use.

PIVAL

Resistance to mold contamination—In Kaplan, Louisiana 550 permanent bait stations exposed during the heat and humidity of full summer remained completely free of mold. Laboratory tests have confirmed the delaying action of Pival to mold contamination in corn meal baits—another important plus to permanent baiting programs.

It is easy to see why wide scale field tests have shown an unusually high degree of successful application of Pival food baits in the control of Norway rats, roof rats and house mice.

Available to manufacturers and re-packers of rodenticides for sale under their own trademark as either the 0.5% concentrate, or as a ready-to-use bait.

MOTOMCO, INC.

10 Murray Street, New York 7, N. Y.

Suppliers' BULLETINS

Scale Seal is Offered

Applied Engineering Company, Orangeburg, S. C., offers the Cunningham Scale Seal, a new device that fits over standard models of weighing scales, protecting from foreign matter and corrosion under severe industrial conditions.

The feature of this device is a patented liquid seal. The sealing flange is fixed continuously around underside of the moving platform; thus an air-tight seal is effected. The column and head of scales is also completely enclosed. An access door and windows provide a means for making weight settings and readings. The entire device is designed as a "take down" model to permit inspection of scales as required by some State laws. Complete details are available from the company.

•

Rare Chemicals Procured

Chemicals Procurement Co., New York, has offered its services as a clearing house for rare chemicals, making available to chemical manufacturers, compounds set aside by other makers as being unsaleable.

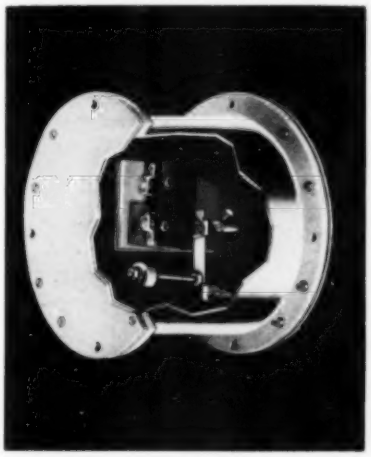
Among chemicals handled by the firm are acids, alcohols, aldehydes and ketones, benzene substitution compounds, diphenyl compounds and various salts. Full information about the service is available from the company, 550 Fifth Ave., New York 36, N. Y.

•

New Model "Bin-Dicator"

A new, lower-priced model in the popular "Bantam Bin-Dicator," bin level indicator, has been announced by the Bin-Dicator Company, 3713946 Kercheval, Detroit 15, Michigan.

The small size product was originally introduced to meet the demand for a unit which could be installed in hoppers, bins, chutes, etc., where installation space was too limited to permit the use of the larger, standard models. The new model is a refinement of the original model and is said to offer wider versatility and lower price.



Above: cut-away view of "Bin-Dicator" mechanism.

Over-all diameter of the new Bantam is 5-¾", and the housing is so designed that it may be mounted on the outside of thin-walled bins, inside of thick walled or multiple compartment bins, or suspended within bins, the makers state. It is thus adaptable to practically any necessary mounting arrangement. The 4" flexible diaphragm is ample for the requirements of such containers, and various types of diaphragm material are available, making the "Bantam" applicable to practically any free-flowing bulk material.

Further particulars are available on request.

•

Big Output from Feeder

Richardson Scale Co., Clifton, N. J., has announced a new vibrating solids feeder with an extra-wide range of outputs. It turns out from 0.1 to 20 cubic feet per minute of fertilizer, or other chemical products.

The new feeder is about half the size of similarly-rated machines, being 28-in. long, 17-in. wide and 19-in. high.

It is said to be inexpensive to operate, having a ⅓ HP motor.

Because of its design, operation of the feeder is claimed to be quiet. Feed rate is controlled by a hand lever on the side of the machine, and may be adjusted during a run. Descriptive literature is available from Richardson Scale Co., Clifton, N. J.

•

New Bag Handling Booklet Out

Paper Shipping Sack Mfgr's. Association has prepared a new General Manual No. 3, presenting a thorough review of recommended practice in the handling, storage and shipment of material packed in paper shipping sacks. Well illustrated with hundreds of photographs, the 42-page booklet gives the reader scores of tips and instructions on loading, storing, handling and otherwise making best use of packing facilities. Copies of the booklet are available from the Paper Shipping Sack Manufacturers' Association, 370 Lexington Ave., New York 17, N. Y.

•

Paper on Superphosphate Mfgr.

The Dorr Company announced recently the availability of a new technical article "The Manufacture of Triple Superphosphate." Prepared by J. J. Porter and J. Frisken, works manager and production manager, respectively, of the Immingham factory of Fisons, Limited, it was presented at a recent meeting of the Fertiliser Society in London.

The paper covers various aspects of the subject including history of manufacture, the chemical reaction between phosphoric acid and

(*Turn to Page 89*)

HERE'S WHY WE WANT TO DO BUSINESS WITH YOU

The organic agricultural chemicals field is a comparatively new one and Columbia-Southern believes that the future for the processor is extremely dynamic. We further believe it is necessary for the supplier and the processor to know each other as intimately as possible if the full potential is to be realized.

We at Columbia-Southern want to do business with you. There is no better way that we know to show you the kind of people we are, the kind of service we render, and the kind of products we furnish to you.

It is our opportunity, when we do business together, to prove to you that we are dedicated to helping you stay in business, to helping you make a profit, and to supplying you with the quality products you want in the quantities you need . . . when you need them.

We sell our products to you but we *give* you our services. And, at your service, is Columbia-Southern's RESEARCH VITALITY, our name for "the urge and ability to develop new ideas." We want you to understand and to benefit from it.

Columbia-Southern is anxious to do business with you, and we hope you'll give us the opportunity. You and we together can do the more perfect job of manufacturing and distributing quality agricultural chemicals.

THESE ARE SOME OF COLUMBIA-SOUTHERN'S DEVELOPMENTS ATTRIBUTED TO "RESEARCH VITALITY"

HI-SIL—the preferred diluent for tough agricultural formulating jobs such as 75% DDT and 36% BHC dust base or wettable powder.

CHLORO-IPC—a real first in the agricultural chemicals field for the control of certain annual grasses and broad-leaved weeds.

42% gamma BHC—a consistently high analysis concentrate for making more stable liquids and more concentrated dust bases.

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Up to four color, high quality printing.
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Assured paper supply.
Range of sizes from 25 lbs. to 110 lbs. *For light insulation materials, up to 7 cu. ft. capacity.*
Variation in plies to resist chemical and physical attack.

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—the one-stop supply source for *all* your base materials and toxicants

FOR "ARAMITE" and OTHER TOXICANTS just pick up the phone or write your nearby General Chemical office. Yes, it's as simple as *that!* You can get all your technical and dust base materials for insecticides, fungicides and herbicides from one *single* source—a *dependable* source—because General Chemical has long been a major producer and supplier to formulators and dust mixers from coast to coast!

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"ARAMITE"
Genite* 883 (p-chlorophenyl p-chlorobenzene sulfonate)
Genite 923 (2,4-Dichlorophenyl Ester Benzene Sulfonic Acid)

TDE (DDD)
Technical, Flake
Dust Base (50% TDE)

DDT
Technical, Flake or Granular
Dust Base, 50% & 75%

BHC
Technical (15%, 36% & 90% Gamma)
Dust Base, 12% Gamma

LINDANE
Technical
Dust Base, 25%, 75%, 95%
Emulsifiable Concentrate, 20%
Oil Concentrate, 20%

LEAD ARSENATE
Standard
Astringent
Basic

CALCIUM ARSENATE
Standard
Low Lime

PARATHION
Dust Base, 25% Emulsifiable, 2 & 4 lbs. per gallon Emulsifiable

FERBAM
Dust Base (76% Ferric Dimethyl Dithiocarbamate)

ZIRAM
Dust Base (76% Zinc Dimethyl Dithiocarbamate)

2,4-D
Acid, and Technical Esters

2,4,5-T
Acid, and Technical Esters

TCA—SODIUM SALT
90% Dry Powder
50% Liquid Concentrate

POTASSIUM CYANATE
Technical
Cotton Defoliant
Weed Killer

URAB
[3 (phenyl)-1, 1-dimethylurea]

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GENERAL CHEMICAL DIVISION
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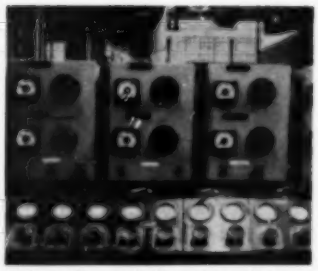
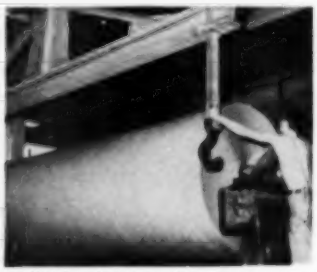
Block-long Fourdriniers sitting side by side turn out an endless strip of kraft 24 hours per day, 7 days per week, 365 days per year. At "wet end" above, kraft is 96% water, 4% pulp. Scene is at modern Florida mill where Hudson Multiwall Sacks are made.



Automatic controls safeguard every foot of kraft manufacture, to assure that your exacting specifications are fully met.



At "dry end" of Fourdrinier, water content has been reduced to proper 6%. Crane removes kraft for rewinding, slitting, and humidity-guarded storage.

Here is why HUDSON can guarantee Multiwall Sacks against breaking on your packer

REASON NUMBER 3 HUDSON MAKES ITS OWN KRAFT

Last year this Hudson mill made enough kraft to lay a 20-foot strip several times around the world. Hudson is a veteran of 31 years in kraft manufacture…but its Multiwall Sack mill is virtually new—with outstandingly advanced equipment.

By making its own kraft, Hudson exerts iron-clad control of Multiwall Sack quality and delivery schedules. This is another reason why Hudson guarantees to replace *without cost* all Hudson Multiwall Sacks that fail on your packing or closing machines.

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the World's most fully GUARANTEED

SEND TODAY: How to store your sacks for maximum performance

Profusely illustrated folder shows you the scientific way to store your sacks. Step by step procedures that improve the performance of your sacks by up-to-minute storage methods. No obligation.

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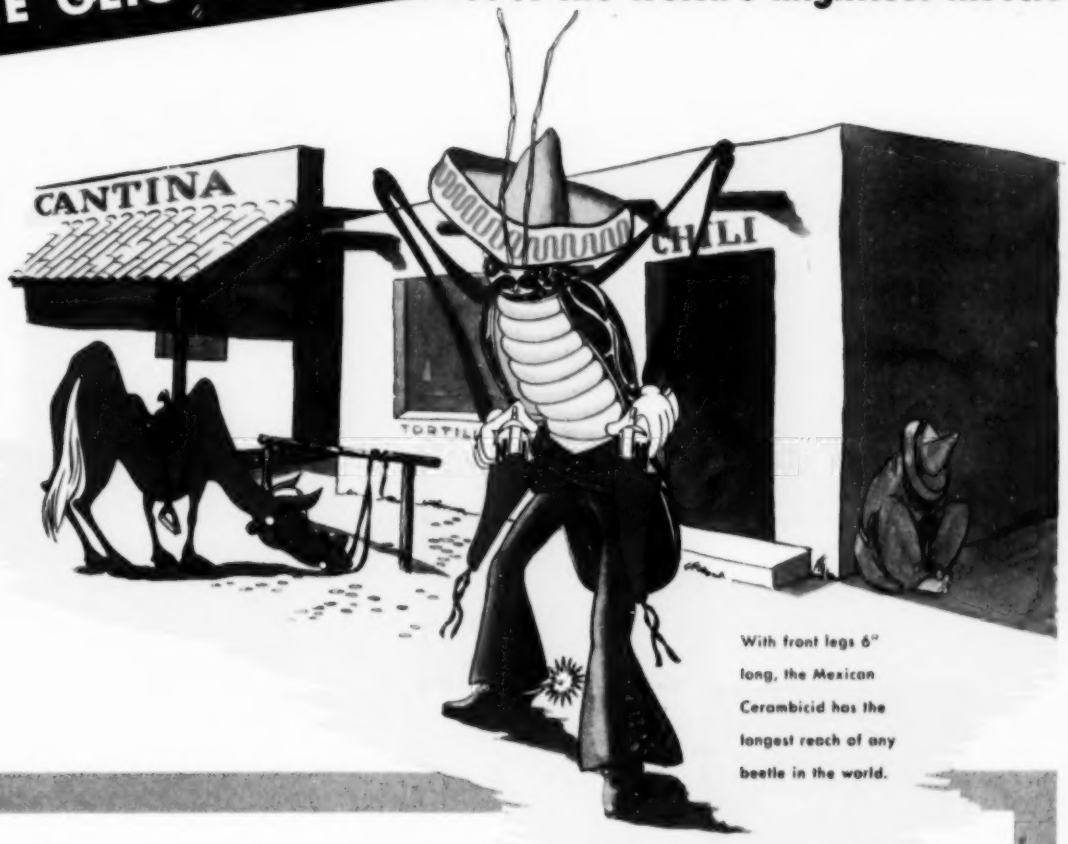
..of the world's mightiest insects



With front legs 6" long, the Mexican Cerambicid has the longest reach of any beetle in the world.

mexican cerambicid VS. the aphid

The Mexican Cerambicid has a boarding house reach, a Pancho Villa swagger and his favorite expression is "Smile when you say that, stranger". And gringo, if you should ever feel his antenna probe the short hair on the back of your neck don't just stand there. Jump right out of your shirt and make tracks to another part of town.

Ah, but the Aphid. You need not fear this spectacular eater—not so long as you are equipped with Geigy insecticides. No matter where you find this pest—in the vegetable fields, cotton fields or orchards—there is a Geigy product specifically designed to control him economically and effectively.

In fact, no matter what your pest problem, depend on Geigy's complete line of agricultural chemicals.

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DISINFECTANTS • TDE (DDD) • TEPP • TOXAPHENE

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phosphate
For the manufacture of industrial chemicals.

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Ground rock phosphate for direct application to the soil.

phosphate
Defluorinated phosphates for feed and mineral manufacturers.

Phosphate Mines and Plants in Florida at Noralyn, Bonnie, Peace Valley, Achan, Mulberry; in Tennessee at Mt. Pleasant and Wales; in Mississippi at Tupelo.

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INDUSTRY *News*

Grace Chem. Advances Three

Grace Chemical Co. has announced further appointments in its sales and technical departments. According to William P. Gage, president, the changes involve C. J. Bown, D. Brittain Briggs and Vincent L. Rebak. The latter has been appointed New York district sales manager. He was formerly assistant to the vice-president of Dodge and Olcott and had been associated previously with other chemical firms.

Mr. Briggs has joined Grace Chemical as a technical assistant in the company's new nitrogen plant now under construction near Memphis, Tenn. He was formerly a process engineer with Carthage Hydrocol in Brownsville, Texas, and holds a degree from Louisiana State University.

Mr. Bown, who joined Grace in 1952 after associations with the Celanese Corp. of America and Union Carbide & Carbon Corp., has been made Memphis district manager.

•

Army Plant May Be Scrapped

General Services Administration has turned over to the U. S. Department of Interior for disposal, the government-owned ammonium nitrate graining plant at Carbondale, Ill. The plant has been offered for sale to a number of companies in the fertilizer field, but no buyer came forth. The plant was used by the army in connection with the overseas fertilizer program. Since this program ended the facility has remained idle. Officials state that unless some other use can be found for the plant, it will be sold for scrap.

•

To V-P Sales Position

CHARLES E. WORKMAN

Charles E. Workman has been named assistant sales manager, Fertilizer Division of Virginia-Carolina Chemical Corporation, according to C. Cecil Ardledge, vice-president.

Mr. Workman first joined the fertilizer sales staff of the corporation in 1937. He has been manager of the East St. Louis, Ill., office since 1947. In his new position he will be transferred to Richmond, Va., where he will be located in the home office of the firm.

•

Ohio Pesticide Tour Planned

August 12, 13 & 14 were the dates set for the annual tour of the Ohio Pesticide Institute scheduled to begin at Wooster and terminate at the Northwest Substation near Hoytville, Ohio, two days later.

Dr. J. D. Wilson, secretary of the Institute, indicated that the itinerary would include stops at the Muck Experimental farm at Celeryville; the H. J. Heinz farm near Fremont; and a series of plots near Pemberville where control measures have been taken against insects and diseases on cucumbers. Spraying demonstrations were scheduled also, to give those in attendance a well-rounded picture of operations in the state.

•

Mathieson Names Campbell

Dr. Joseph D. Campbell has been appointed horticulturist in the Agricultural Department of Mathieson Agricultural Chemicals Division. He will be associated with Dr. A. M. Smith, chief agriculturist, in the company's Baltimore office and will work in cooperation with the Eastern Sales Division.

Dr. Campbell is a native of Saskatchewan and holds the degrees of B.S. in agriculture from the University of Saskatchewan, M.S. in horticulture from MacDonald College, McGill University, and Ph.D. in horticulture from Michigan State College.

•

N.S.T.C. in Chicago August 17

The National Shade Tree Conference will hold a five-day meeting in Chicago, beginning August 17. The advance program indicated that a panel discussion will be held on "Developments in Oak Wilt Research"; and another panel on "Elm Diseases" will be featured.

Forrest Strong, Michigan State College, East Lansing, will present

a paper, "Spruce Branch Canker", and another discussion on "What we have Learned about Mist Spraying" will be held.

Another subject listed for consideration is "Practical Blossom Control for the Arborist."

•

Budd Admanager of Hercules

M. R. ("Monty") Budd has been named director of advertising by Hercules Powder Company, Wilmington, Del., to succeed Theodore Marvin, now president of Michigan Chemical Corp., Saint Louis, Mich.

Mr. Budd, well-known in the pesticide trade through his activities with the NAC Association, joined Hercules in 1929 as assistant editor of a company publication. In 1932, he became assistant manager of the company's advertising department, but during the war years served as coordinator of employe relations in the Explosives Department. He returned to the advertising department in 1945 as assistant director.

He holds a degree from the Colorado School of Mines.

•

Canadian Plant Expands

Ontario Plant Foods, Delhi, Ont., Canada, plans an addition to its fertilizer manufacturing plant. The addition will be 112 feet in length and 107 feet in width. The increased volume will be used to satisfy anticipated demand for the 1954 season, according to George Roe, general manager.

•

New Devenco Sales Manager

JOHN T. GILLESPIE

John T. Gillespie, Jr. has been appointed sales manager of the newly organized Swingfire Division of Devenco Incorporated, New York. Mr. Gillespie will not only direct the merchandising of "Swingfog" but also of other items in the "Swingfire" group. He is now actively engaged in setting up dealerships throughout Devenco's licensed area.

Devenco is the sole licensee in the United States, Canada, Mexico, Central America and the Philippines for the manufacture, sale and distribution of the "Swingfog" insecticide applicator, a light, portable apparatus operating on the pulse-jet principle.

N. Division Offers "Sodan"

Nitrogen Division, Allied Chemical & Dye Corp., New York, has announced a new direct-application solution, "Sodan" said to be the first such to contain nitrate of soda. The makers state that this special feature makes it particularly beneficial to a wide variety of crops.

The first tank cars of "Sodan" have been shipped to southern and midwestern areas. It will be applied on pastures and small grains and on row crops such as corn, cotton and vegetables.

The new solution is said to afford a safe, easily handled, economical means of applying supplemental nitrogen. The product is a clear, colorless liquid containing approximately 20% nitrogen, in the form of sodium nitrate and ammonium nitrate.

•

Penick Acquires Hopkins Stock

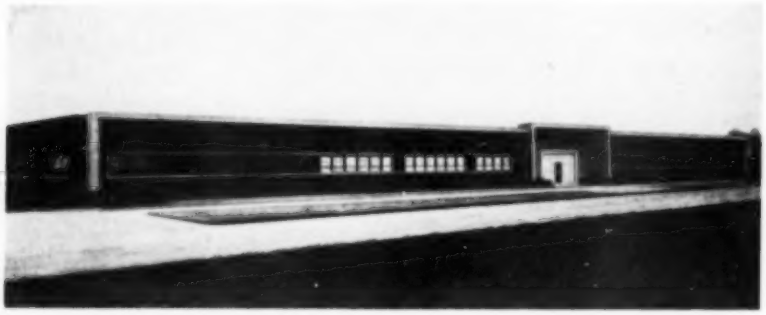
Inventories and other assets of J. L. Hopkins Co., Brooklyn, N. Y., were recently taken over by S. B. Penick & Co., New York following liquidation of the former firm. Among reasons named for discontinuance of the Hopkins company were "the risky character of the business, including highly technical problems of quality which in turn meant the maintenance of a substantial scientific staff in a field of business that could not provide for such facilities within the margin of profit," it was reported.

•

Mitchell to Nyotex Position

Appointment of C. W. Mitchell as executive vice-president of Nyotex Chemical Company, Houston, Texas, has been announced by G. L. Bond, president, Consolidated Chemical Industries Inc. Mr. Mitchell spent 17 years with the Missouri Pacific Railroad and has been with Consolidated Chemical for 24 years. He was vice-president of Nyotex prior to his appointment. Nyotex Chemical Company manufactures aluminum chloride, hydrofluoric acid and lime. It is a mutually-owned subsidiary of Consolidated Chemical Industries Inc., Stauffer Chemical Company, and Harshaw Chemical Company.

New Plant For Bemis At Memphis, Tennesse



The move of Bemis Bro. Bag Company's manufacturing operations from its former location in Memphis to the modern 120-thousand square foot building pictured above, has been nearly completed. By making the move piecemeal, it was possible to change locations without interrupting its service to customers, the company states. The new, specially-designed plant is located in a modern industrial subdivision of Memphis. Efficient operation and employee comfort are stressed in the one-story, steel, concrete and brick building. The 8,000 square foot office space is air conditioned and has the latest type of lighting, acoustical and decorative treatment.

Former Fertilizer Head Dies

Ross Nadeau, 55, S. Orange, N. J., former president of the American Soil Builders Co., Newark, died July 24. He had patented an organic fertilizer product, "Alkemi Soil Builder" which was marketed through his company.

•

Chase Bag Advances Three

Chase Bag Company has appointed three new regional sales directors, according to W. N. Brock, general sales manager, Chicago. The new appointees are J. A. Brewster, J. H. Counce and J. P. Grady.

Mr. Brewster is now western regional sales director. The western region will represent the territories now responsible to the Portland and Los Angeles branches. He has been with Chase for over 30 years.

Mr. Counce is the new southern regional sales director. The southern region will represent the territories and sales offices now responsible to the Dallas, New Orleans, and Orlando branches. Mr. Counce joined the company over fifteen years ago as a salesman in the New Orleans territory and was later made sales manager of that branch. In 1944 he was promoted to manager of the New Orleans branch.

Mr. Grady is eastern regional sales director, representing the territories and sales offices formerly responsible to the Buffalo, New York, Philadelphia and Richmond branches.

In addition to handling these new duties, each regional sales director will continue in his present capacity as branch manager.

Chase has also announced that Harrison B. Rue of the Buffalo branch, has been made branch manager. He was formerly acting manager. Mr. Rue joined Chase in the New Orleans territory after World War II.

•

Ohio Plant Century Old

Stadler Fertilizer Co., Cleveland, Ohio, expects to celebrate its 100th anniversary in 1954 with the opening of a $100,000 addition to its plant facilities. President of the company is W. W. Johnson.

Florida Enacts New Pesticide Law

FLORIDA'S new pesticide law, passed at the recent session of the state legislature, provides for registration fees of $10 for each brand registered annually, for the first ten brands and $2.50 for each brand in excess of ten. The new law which went into effect without approval of the Governor, covers insecticides, fungicides, herbicides, rodenticides and disinfectants as well as household pesticides.

According to Phil S. Taylor, supervising inspector of the Inspection Bureau of the Florida State Department of Agriculture, all manufacturers and distributors of pesticides doing business in Florida must fill out applications for registration.* Two copies of labels proposed to be used on each brand are to be submitted with the application, Mr. Taylor says.

In a note of instructions for registering pesticides in Florida, Mr. Taylor tells manufacturers and distributors that they should list all brands or grades in alphabetical order on the reverse side of cover sheets. Where changes in guarantees or ingredients are desired on a registered product, then revised labels with covering letter should be sent, stating the changes desired. In cases where changes are to be made in the brand name of a registered product, a new application blank should be used. It should be attached to two copies of the new label.

Mr. Taylor's instructions covered labeling as follows:

Each container must bear a label showing the following information:

(1) Name and address of the manufacturer and/or registrant;

(2) Name, brand or trade-mark under which the article is sold;

(3) Net weight or measure of the contents;

(4) Guaranteed Analysis: A statement of the name and percentage amount of each active ingredient, together with the total percentage of inert ingredients; *where a household pesticide label shows active ingredients but not percentages of same, the registrant must show the name and percentage of all active ingredients in the space provided on back of registration form.*

If the economic poison contains arsenic in any form, the ingredient statement must also include a statement of total and water soluble arsenic, each calculated as elemental arsenic.

If ground sulphur is used as dust, state mesh test.

Highly poisonous materials should bear a poison label — skull and crossbones — and suitable antidote. Suitable antidotes will be supplied by this Department on request. All toxic materials must show a caution or warning statement, as recommended by the U. S. Department of Agriculture, on the label.

Enforcement of the new law is under the direction of the state chemist who determines whether pesticidal products comply with requirements of the Act. Any person cited will have opportunity to present his views, either orally or in writing with regard to the proceedings. "If, thereafter, in the opinion of the Commissioner, it shall appear that the provisions of the Act have been violated . . . then the Commissioner shall refer the facts to the prosecuting attorney for the county in which the violation shall have occurred, with a copy of the results of the analysis or the examination of such article . . ." the law provides.

Stop sale and seizures are provided for in the Act as follows:

"Any pesticide (or device) that is distributed, sold or offered for sale within this State or delivered for transportation or transported in intrastate commerce or between points within this State through any point outside this State, shall be liable to be proceeded against in any court of

*Application blanks and other information are available from the Florida State Department of Agriculture, Inspection Bureau, Box 1220, Tallahassee, Florida.

GET MORE SUMMER BUSINESS

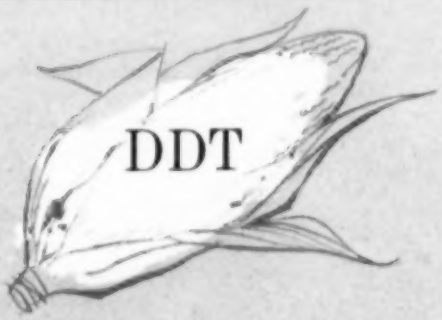
sell these 3 Monsanto Insecticides

There's still time to build insecticide sales this year. Here is an up-to-date check list, showing recommended insecticides for specific insects still due to give trouble this summer.

PARATHION

(Monsanto Niran*).—Highly useful against cotton, orchard, and greenhouse pests. *Particularly effective in melon areas for cantaloup pests.* Controls:

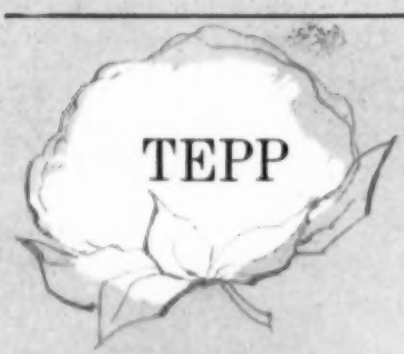
- Clover mite
- Two-spotted spider mite
- Pacific mite
- Williamette mite
- Strawberry spider mite
- Citrus red mite
- European red mite
- Thrips
- Leaf hoppers
- Aphids—many species
- Mealy bug
- Greenhouse whitefly
- Blister beetles
- Mexican bean beetle
- Colorado potato beetle
- Spotted cucumber beetle
- Striped cucumber beetle
- Flea beetles
- Cabbage worms
- Corn-earworm
- Fall armyworm
- European corn borer
- . . . and other insects



DDT

(Monsanto Santobane*).—Still the best control for pink bollworm. Also:

- Boll weevil
- Corn-earworm
- Cotton flea hopper
- Lygus bugs
- Colorado potato beetle
- Potato leaf hopper
- Cabbage worm
- Rose chafer
- Japanese beetle
- Peach-tree borer
- Poultry lice
- Housefly
- Mosquito
- . . . and other insects



TEPP

(Monsanto Nifos*-T).—Effective at low concentration. Controls:

- Two-spotted spider mite
- Pacific mite
- Citrus red mite
- European red mite
- Greenhouse thrips
- Leaf hoppers
- Aphids—many species
- Citrus mealybug
- Mexican mealybug
- Greenhouse whitefly
- Lace bugs
- Mushroom flies
- . . . and other insects

**Reg. U.S. Pat. Off.*

WRITE for informative booklets on these 3 insecticides. Monsanto Chemical Company, Organic Chemicals Division, 800 North Twelfth Blvd., St. Louis 1, Missouri.

MONSANTO
CHEMICALS- PLASTICS

SERVING INDUSTRY...
WHICH SERVES MANKIND

competent jurisdiction in any county of the State where it may be found and seized for confiscation by process of libel for condemnation: The Commissioner of Agriculture, or his duly authorized representative, may withhold from sale by Stop Sale notice any pesticide which does not meet the requirements of this Act as follows:

"A. In the case of a pesticide—

"1a. if it is adulterated or misbranded;

"2a. if it has not been registered under the provision of Section 4 of this Act;

"3a. if it fails to bear on its label the information required by this Act;

"4a. if it is a white powder pesticide and is not colored as required under this Act;

"5a. if highly toxic to man and the labeling or container does not meet the requirements of this Act.

"B. In the case of a device, if it is misbranded.

"If the article is condemned, it shall, after entry of decree, be disposed of by destruction or sale as the court may direct and the proceeds, if such article is sold, less legal costs, shall be paid to the General Inspection Fund: Provided, That the article shall not be sold contrary to the provision of this Act; and Provided further, That upon payment of costs and execution and delivery of a good and sufficient bond conditioned that the article shall not be disposed of unlawfully, the court may direct that said article be delivered to the owner thereof for relabeling or reprocessing as the case may be; and Provided, That when a pesticide (or device) has been found in violation of the provisions of this Act, the owner or claimant may, in lieu of prosecution, surrender the article for confiscation and destruction to a duly appointed representative of the Commissioner. "When a decree of condemnation is entered against the article, court costs and fees and storage and other proper expense shall be awarded against the person, if any, intervening as claimant of the article."

The new Act repeals Chapter 17992, Laws of Florida, Acts of 1937, which up to the time the new law was passed, had governed the movement of pesticidal materials in the state.

•

Arkansas Sets New Fees

Registration fees charged by the Arkansas Plant Board for sale of economic poisons in the state have been announced by chief inspector Paul H. Millar. Following a public hearing at which manufacturers' representatives were among those discussing the subject, the board adopted a scale of $5 for registration of the first ten poisons and $2 for registration of each additional poison. Insecticides, fungicides, herbicides and rodenticides are included in this registration bracket. The fees will be used to finance a program of sampling and testing in the Board's laboratories to determine whether products offered for sale comply with manufacturers' guarantees.

J. O. Dockery Air Service, Stuttgart, Ark. has filed suit against the Arkansas Plant Board in Pulaski Circuit Court, attacking the Board's regulations on the use of 2,4-D and similar herbicides as unconstitutional. The flying firm specifically protests the Board's requirement that each custom sprayer handling such contracts obtain an operating permit from the Board. The suit declares that 2,4-D is used principally in Arkansas to eradicate weeds from rice fields, and that aerial application has proved to be the most effective method. New regulations on use of herbicides were issued by the Board this spring.

•

Pennsalt Plant Operating

Pennsylvania Salt Mfg. Company's Calvert City (Ky.) works for electrolytic chlorine and caustic soda is now in production. This plant, costing $8 million, is part of an overall $12 million program which includes a new synthetic ammonia plant at the company's works at Wyandotte, Michigan.

Lime Consumption Increases

The National Lime Association estimates that the production of lime in the U. S. has increased about 15% since 1950. Robert S. Boynton, the association's general manager, announced that the industry is now operating at about 95% capacity and is not suffering from over-expansion.

Demand for lime continues to be as strong as at any time during the past three years, Mr. Boynton says, and points out that a number of lime-consuming industries are scheduled to increase their consumption of the material. New tonnages to be used by these industries will be around 350,000 tons per year, he says.

•

Nitrogen Div. to Aid Research

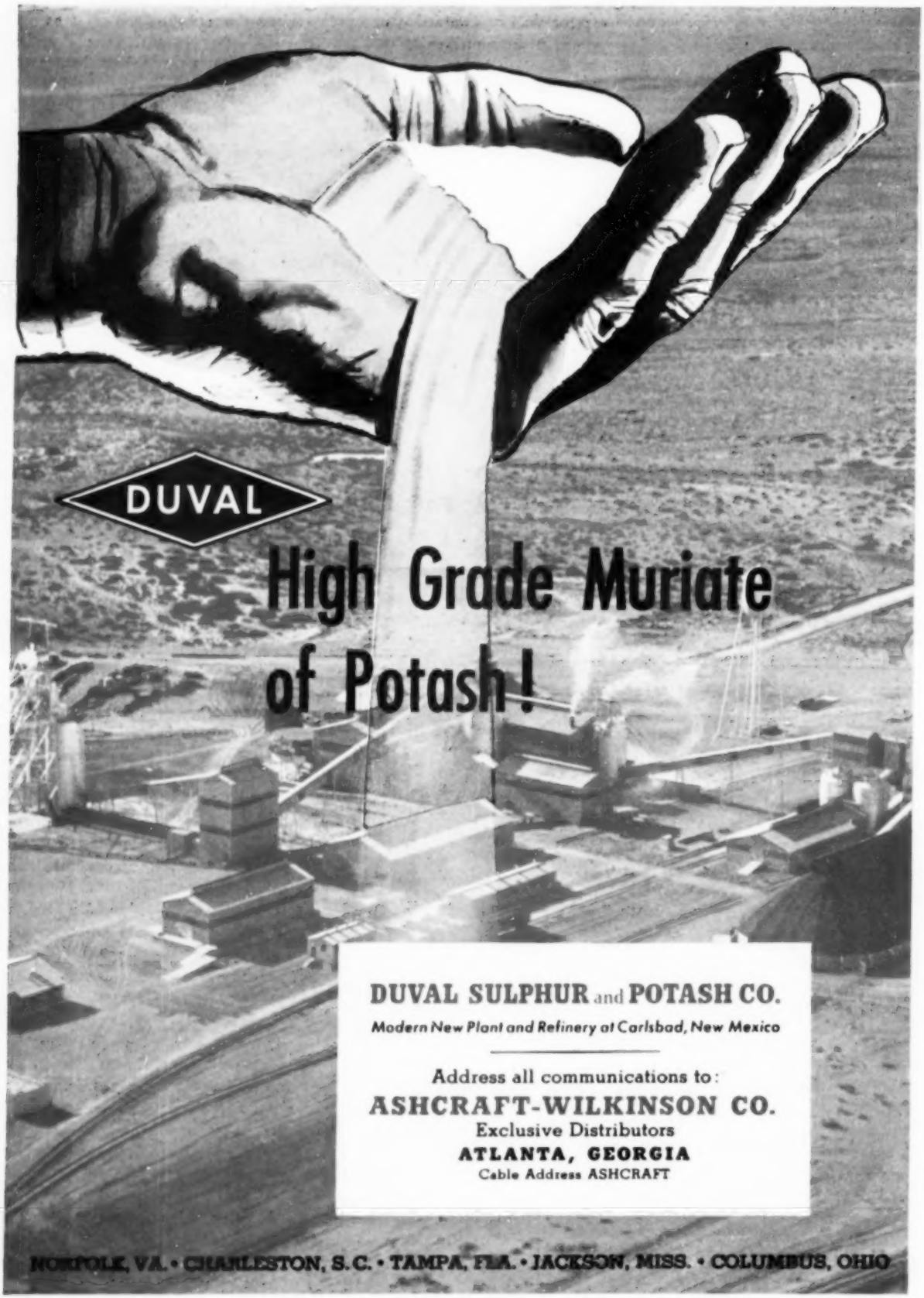
A grants-in-aid program in which $30,000 will be paid to agricultural colleges for research on fertilizers and other nitrogen chemicals, has been announced by the Nitrogen Division of Allied Chemical & Dye Corporation, New York.

Arrangements have been made with agricultural colleges in Southern, Mid-Atlantic and Midwestern states to receive grants for research. Projects covered by the program will relate to the use of liquid and solid forms of nitrogen fertilizers on corn, small grain, pastures and other crops.

This 1953 program is a continuation of the company's long-term sponsorship of agricultural research which complements its own research in this field. In the past 30 years this research has produced a number of leading advances in nitrogen technology. Also, it has given young agricultural scientists opportunity to conduct graduate research in unexplored areas of crop fertility.

In addition to fundamental laboratory research, field tests will be conducted on crops growing under conditions of varying climate and soil fertility. Also included will be research on the use of nitrogen to revive worn-out soils.

The grants-in-aid program includes provision for research on the use of synthetic urea as a partial replacement of natural proteins in feeding cattle.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New Fertilizer Rules in S. A.

Colombia has established new requirements for commercial fertilizers, it has been learned in the U. S. The new rules include a procedure for the official inspection and registration of all commercial fertilizers, both domestic and imported, before sale or distribution. It also governs the markings or labels required on bags or containers of fertilizer, and lists penalties to be imposed if contents fail to conform with labels.

Details of the new regulations concerning fertilizer traffic may be obtained from the American Republics Division, Office of International Trade, U. S. Department of Commerce, Washington, D. C.

•

Dr. Jaeger, Cyanamid, Dies

Dr. Alphons O. Jaeger, 67, American Cyanamid Company, died suddenly July 21st. Dr. Jaeger held hundreds of patents on important chemical manufacturing processes which he developed during his 40 year career in the chemical industry. Among his most important developments is a vanadium catalyst for sulfuric acid production, which has become the basis of more than 90% of the world's sulfuric acid producing facilities constructed in the past quarter century.

Dr. Jaeger was born in Bergzabern, Germany, in 1886, and received degrees from the Institute of Technology, Friedburg, Germany, the University of Zurich, Switzerland, and the University of Basel, Switzerland.

He came to the United States in 1923 and later became vice-president of the Seldon Company of Bridgeville, Pennsylvania, when that firm merged with American Cyanamid Company.

He joined the parent firm in New York in 1938 and until 1951, was chairman of the Development Committee, director of the General Technical Department, and a member of the Research, New Projects, and Process Development Committees. Following his retirement in 1951, he had been a consultant for the company.

•

Cushing to Western Post

L. N. West, executive vice-president of Wilson & Geo. Meyer & Co., has announced appointment of Thomas R. Cushing, Seattle, Wash., to manage phosphatic fertilizer sales of the firm's fertilizer department.

Mr. Cushing will be associated with Ralph S. Waltz, department manager, in the sale and distribution of the firm's agricultural chemicals throughout the eleven Western States. Prior to his transfer, Cushing was employed in the company's Seattle office.

Born in Michigan, Mr. Cushing was graduated from Albion College, Albion, Mich., locating thereafter in the State of Washington, where he joined Meyer last year.

Wilson & Geo. Meyer & Co. are Western sales representatives for some of the leading agricultural and industrial chemical producers, including Stauffer Chemical and Western Phosphates, Inc., manufacturers of phosphate fertilizers; Norsk Hydro of Oslo, Norway, producers of calcium nitrate and urea; American Potash and Chemical Corporation, which manufactures potash salts; Eastman Chemical Products, Inc.; and Canadian Peat Sales, Ltd., Vancouver, B. C., processors of peat moss.

The 102-year-old Meyer firm maintains offices and warehouses in Los Angeles, Fresno, San Francisco, Portland and Seattle.

Davison's New $12 Million Plant Under Way in Florida

Aerial photo, taken in mid-June, 1953, shows progress in construction of The Davison Chemical Corporation's $12,000,000 plant for triple superphosphate manufacture at Bartow, Fla. Scheduled for completion late this year, the plant will have an annual capacity of 200,000 tons. Plans for uranium recovery have not been completed. Building at right most nearly completed is finished product warehouse, 325 feet long. Large concrete silos near center are for storage of phosphate rock; erection of the main process building has just been started adjoining the silos.

One-Stop NITROGEN Service For Fertilizer Manufacturers

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FERTILIZER MATERIALS

LION ANHYDROUS AMMONIA—For formulation. A uniformly high-quality basic product. Nitrogen content, 82.25%.

LION AQUA AMMONIA—For formulation or acid oxidation. Ammonia content about 30%. Other grades to suit you.

LION AMMONIUM NITRATE FERTILIZER—For direct application or formulation. Improved spherical pellets. Guaranteed 33.5% nitrogen.

LION NITROGEN FERTILIZER SOLUTIONS—For formulation. Three types to suit varying weather and manufacturing conditions.

LION SULPHATE OF AMMONIA—For direct application or formulation. Large free-flowing crystals. Guaranteed nitrogen content, 21%.

TECHNICAL SERVICE—Lion provides special technical assistance for fertilizer manufacturers. Write to CHEMICAL SALES DIVISION for quick service.

LION OIL COMPANY

EL DORADO, ARKANSAS

News BREVITIES

CONSTRUCTION HAS BEEN STARTED on a new $8,500,000 B. F. Goodrich Co. chemical plant at Calvert City, Ky., the company has announced. The new facility is adjacent to a $6,000,000 vinyl chloride monomer plant recently opened by BFG. When completed in the fall of 1954 the new plant will have an annual capacity of 24 million pounds.

It will manufacture acrylonitrile, used in making soil conditioners and a number of other chemical products.

•

F. HARRIS NICHOLS, 81, retired vice-president of the General Chemical Co., New York, died at his home in Greenwich, Conn., July 12. His business career started with the Nichols Chemical Co., owned by the family. The firm later became the General Chemical Co. Mr. Nichols retired in 1950.

•

S. E. SHELBY HAS BEEN NAMED general production manager of all the plants of Federal Chemical Co., Louisville, Ky., the company has announced. Mr. Shelby joined Federal in 1948 and headed the engineering department. He is a graduate of Vanderbilt University. Federal operates fertilizer plants in Nashville and Humboldt, Tennessee; Louisville, Ky.; Columbus, Ohio; Butler, Indiana and Danville, Illinois.

•

DAVID G. HOYER has been named sales manager of the Agricultural Chemicals Department of J. M. Baird Company, 254 West 31st St., New York. Mr. Hoyer was formerly associated with the Pittsburgh Coke & Chemical Co.

•

DR. PAUL L. SALZBERG, has been made director of the Chemical Department of the E. I. Du Pont de Nemours & Company, succeeding Dr. Cole Coolidge who died in July. Dr. Salzberg has been associated with Du Pont research since 1928 and has been assistant director of the Chemical Department for two years. He has been personally active in research work as well as in the direction of scientific programs. Sixty-three patents in the fields of synthetic organic chemistry, polymers, and insecticides have been isued in his name.

•

A LARGE NUMBER OF AMERICAN fertilizer manufacturers were included among the nearly 200 persons attending the eighth annual convention of the Canadian Plant Food Producers at St. Andrews-by-the-Sea, N. B., July 6-10. The hotel Algonquin was headquarters. Among the speakers to appear on the program were Dr. Russell Coleman, president, National Fertilizer Association; and Paul T. Truitt, president, American Plant Food Council, Inc., both of Washington, D. C.

•

DAVISON CHEMICAL CORPORATION, Baltimore, has announced establishment of new sales offices in Chicago, Lake Charles, La. and Columbus, Ohio. The three new offices will handle sales for the Industrial Chemicals Division. Territories to be serviced from these new offices were formerly handled from Baltimore.

•

FIFTY PERCENT INTEREST in the fertilizer and insecticide plant operated at Lebanon, Pa. under the corporate name of Central Chemical Corporation of Lebanon, has been purchased by Vernon Bishop who becomes full owner of the corporation. Interest in the company was sold by Franklin M. Thomas, Sr., president of Central Chemical Corp., Hagerstown, Md., which operates nine fertilizer and insecticide plants in Maryland, Pennsylvania, Virginia and New York.

•

MAX F. MUELLER HAS BEEN NAMED chief technologist of Grace Chemical Company's nineteen-million-dollar nitrogen plant now under construction near Memphis, Tenn. Mr. Mueller was formerly chief engineer for J. T. Baker Company. Since graduation from the University of Michigan as a chemical engineer, Mr. Mueller has been engaged in project and process engineering work in the chemical industry in Michigan, Maryland, and Pennsylvania.

Temporarily, Mr. Mueller will be assigned to the Development Department of Grace Chemical Company in New York until he takes up his duties later as chief technologist for the plant.

•

J. RICHTER SALVESEN, director of Marathon Corporation's Central Research Department at Rothschild, Wisconsin, will attend the 13th International Congress of Pure and Applied Chemistry in Stockholm, Sweden, July 29 to August 4. He has been named Honorary Chairman of the Lignin Section of the Wood Symposium, in recognition of his 27 years of research on lignin products for Marathon's Chemical Division.

•

AMERICAN AGRICULTURAL CHEMICAL CO., New York, is building a new fertilizer plant on highway 65 at Cairo, Ohio. The new facility will include a standardized wet-mix steel building of 24,300 sq. ft., built by Luria Engineering Co., Bethlehem, Pa. An additional dry-mix building will be erected by A. J. Sackett Co., Baltimore, Md. Scheduled completion has been set for the fourth quarter of 1953.

•

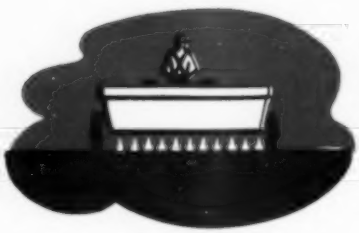
STEVE TATEM, PRESIDENT of the California Fertilizer Association, has been transferred by Swift & Company from its Los Angeles plant to a new post as manager of the firm's Houston, Texas, Plant Food Division. Mr. Tatem's Los Angeles position has been taken by Henry C. Hopewell, formerly credit manager for all Plant Food Divisions of Swift.

•

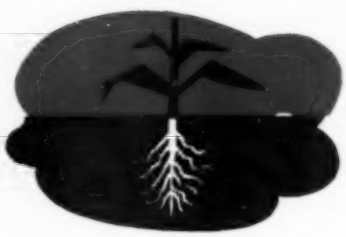
MASON P. PEARSALL has been made technical director of Davies Nitrate Co., New York, the company has announced. Mr. Pearsall is a graduate of Lehigh University with a B.S. degree in chemical engineering. He joined Davies last year.

DAVISON GRANULATED Superphosphate 3 WAY CONTROL

STORAGE CONTROL—No caking or lumping while in storage.



APPLICATION CONTROL—No dusting or bridging; drills free and even.



FOOD CONTROL—Supplies plant food at a uniform rate.

Now it is possible for you to store superphosphate without fear of its caking . . . that is, if it is DAVCO GRANULATED SUPERPHOSPHATE. DAVCO Granulated Superphosphate will not become hard or caked . . . it is easier to apply in the field because there is no dusting or bridging over in the drill.

DAVCO Granulated Superphosphate gives complete coverage in the field . . . drilling freely and evenly . . . supplying each plant with a uniform quantity of nutrient phosphorus.

Get DAVCO Granulated Superphosphate . . . the superphosphate that gives you the added sales points through its 3-way control.

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Fertilizer Officials Plan

Plans are partially complete for the October meeting of the American Association of Fertilizer Control Officials scheduled to meet at the Shoreham Hotel, Washington, D. C., October 16. According to information from Dr. Bruce D. Cloaninger, Clemson, S. C., secretary of the group, the meeting will open with an address by Parks A. Yeats, Oklahoma City, Okla., president.

Dr. Russell Coleman, president, National Fertilizer Association, Washington, D. C. and Paul T. Truitt, American Plant Food Council, also of Washington, will follow on the program preceding E. A. Epps, Baton Rouge, who will discuss current problems faced by officials.

Aaron Baxter, Coke Oven Ammonia Research Bureau, Inc. will speak on "Evaluation of Secondary Elements in Fertilizers"; Dr. Vincent Sauchelli, Davison Chemical Corp., Baltimore, Md., on "Present Status of Surface Wetting Agents for Fertilizer Use"; and "Progress in Fertilizer Granulation" will be presented by J. O. Hardesty and R. M. Magness.

Foliar application of plant nutrients will be the subject of a paper presented by Dr. Jackson B. Hester, Campbell Soup Co.

Reports of investigators will be made by the following control officials: M. H. Snyder, Charleston, W. Va.; M. P. Etheredge, State College, Miss.; J. W. Kuzmeski, Amherst, Mass.; J. F. Fudge, College Station, Texas; R. W. Ludwick, State College, N. M.; W. B. Griem, Madison, Wis.; J. B. Smith, Kingston, R. I.; R. C. Berry, Richmond, Va.; Gordon Hart, Tallahassee, Fla.; E. W. Constable, Raleigh, N. C.; John L. Managhan, Topeka, Kans.; Parks A. Yeats, Oklahoma City, Okla.; F. W. Quackenbush, Lafayette, Ind.; A. H. Harris, Raleigh, N. C.; A. B. Lemmon, Sacramento, Cal.; E. A. Epps, Jr., Baton Rouge, La.; and M. B. Rowe, Richmond, Va.

•

Wider Range for "Aramite"

Naugatuck Chemical Division, U. S. Rubber Co., has announced that its insecticidal product, "Aramite" can now be used on cotton, pears, prunes, watermelons, cantaloupe, celery, blueberries, raspberries, strawberries, soybeans, sweet corn, tomatoes, roses, alfalfa and clover. Previously, the material had been useful for the control of mites on only a few vegetables and on nursery stock.

"Aramite" is said to possess good residual properties, has little effect on mite predators, is compatible with many other insecticides, and is of relatively low toxicity to humans.

•

Joins CSC Organization

ROBERT A. MOHRMAN

Robert A. Mohrman has joined the sales staff of the Industrial Chemicals Department of Commercial Solvents Corporation, working out of the New York district office, it has been announced by W. Ward Jackson, general manager.

Mr. Mohrman was formerly with the Barrett and Nitrogen Divisions of Allied Chemical, and with the Borden Company. A Penn State University chemistry graduate, he served four years during World War II with the U. S. Signal Corps as a photographer-paratrooper in the Pacific Theatre.

•

New CSC N Plants Operating

Commercial Solvents Corp., New York, has announced that its new ammonia plant facilities at Sterlington, Louisiana, expected to double the company's former output of nitrogen for agricultural and industrial use, are already on stream. In addition, the company reports, the new units for nitrogen solutions and crystalline ammonium nitrate fertilizer are also in operation.

These new facilities comprise the first privately-financed post war nitrogen plant. CSC states that the total output from these facilities is already committed for the coming year, emphasizing the continuing shortage of nitrogen.

•

American Cyanamid Appoints

Appointments of Michael Tackney as safety director, John Mackay as Oxygen Department superintendent, and Gerard Butler as a production supervisor of American Cyanamid Company's nitrogen chemicals plant near New Orleans have been announced by Gerard J. Forney, plant manager.

Mr. Tackney was transferred to the Fortier Plant from Cyanamid's Canadian subsidiary, North American Cyanamid Limited, where he was Safety Supervisor of the Welland, Ontario, Plant. Mr. Mackay comes from Canadair Ltd., Montreal, Canada, where he was a Planning Engineer; and Mr. Butler joined American Cyanamid in 1951. He was first employed by the firm's Lederle Laboratories Division at Pearl River, New York and later worked for Chemical Construction Corporation, a Cyanamid subsidiary which designed the Fortier plant.

•

Conn. Field Day All Set

Final plans have been made for the annual field day of the Connecticut Agricultural Experiment Station to be held August 19 at the experimental farm at Carmel, Conn. Beginning at 10 a.m., the day's program will feature soils research. A 100-foot exhibit is planned to show how all station departments are concerned with this subject. A number of special tours and demonstrations will be on the agenda, with tractor-pulled wagons available to transport the visitors over the experimental plots.

Dr. Firman E. Bear, head of the Soils Department of New Jersey Agricultural Experiment Station, New Brunswick, N. J., will address the group on "Soil — The Substance of Things Hoped For", as the feature talk of the day.

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Sell *Pittsburgh* Parathion WP and you'll find your customers coming back for more . . . season after season. For *Pittsburgh* Parathion Wettable Powder is safer and easier to use—thanks to a *dustless* formulation which is packed in strong paper bags and heat-sealed to prevent leakage.

Pittsburgh Parathion WP is a versatile, highly effective insecticide which controls over 20 major insect pests, including aphid, greenbug, leaf roller, leaf hopper, armyworm, European red mite and European corn borer. Your customers will consistently achieve excellent results with *Pittsburgh* Parathion WP because it's *Quality Controlled* from coal to finished product at our basic and integrated agricultural chemical plant. ● Write today for additional sales or technical information.

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day have been under the direction of Dr. James G. Horsfall, director of the Station.

•

Davison Appoints Vasbinder

Advancement of V. G. Vasbinder, branch plant manager of The Davison Chemical Corporation's mixed fertilizer plant at Lansing, Mich., has been announced by W. W. Watmough, Jr., vice-president.

Mr. Vasbinder, formerly assistant branch plant manager, moves up to fill the post formerly occupied by B. C. Manker, who in July, 1952, was made district manager at Lansing, with a number of Davison fertilizer plants under his supervision. Mr. Vasbinder, who has been with Davison since 1932, came to Lansing when Davison acquired that plant in December 1951, moving from Alliance, Ohio, where he had also been assistant branch plant manager.

•

Move Pittsburgh Ag. Chem. Div.

Pittsburgh Coke & Chemical Company, Pittsburgh, has announced the appointment of Herbert F. Tomasek as manager of its Agricultural Chemical Division and the transfer of the division's main office from New York City to the company's home office in the Grant Building, Pittsburgh — effective September 1, 1953.

Known as the Pittsburgh Agricultural Chemical Company since the beginning of its operation in 1948, the organization's status as the Agricultural Chemical Division of Pittsburgh Coke & Chemical is also effective September 1.

Appointment of W. Scott James as division sales manager and J. B. Skaptason as division director, new products development, was announced at the same time. Prior to his appointment as manager of the Agricultural Chemical Division, Mr. Tomasek was central states sales manager for the division. Both Mr. James and Mr. Skaptason served on the division's executive staff in its former New York office.

•

Lunsford Forms Empire Chem.

Empire Chemical & Supply Co. has been established by C. F. Lunsford at 420 Market St., San Francisco, to process and sell pesticides and other chemicals. The company will handle both domestic and export business, with emphasis on sales to Latin America and middle Europe. Mr. Lunsford has had twenty-five years experience in the agricultural chemical field, most recently with W. R. Grace & Co. The firm will also maintain an office in Washington, D. C., under the supervision of Howard W. Doerr, formerly head of the agricultural chemicals section of the Office of Price Stabilization. The address will be P. O. Box 905, Alexandria, Va.

"Coumachlor" New Coined Name for Rodenticide

THE Interdepartmental Committee on Pest Control has coined the name "Coumachlor" to designate the rodenticide 3-(alpha-acetonyl-4-chlorobenzyl)-4-hydroxy-coumarin, previously referred to as "Tomorin" and as "Geigy Rodenticide Exp. 332."

Approval of the name "coumachlor" by the Interdepartmental Committee on Pest Control implies that the name is available for free use in designating the pure chemical 3-(alpha-acetonyl-4-chlorobenzyl)-4-hydroxycoumarin.

The name "coumachlor" applies to the pure chemical. A purified product, which contains a minimum of 98% of the pure compound, is used in the formulation of bait concentrates.

Practically insoluble in water, the rodenticide is slightly soluble in benzene and ether, soluble in methanol, ethanol and isopropanol, and very soluble in acetone and chloroform.

Coumachlor is a relatively stable compound. When combined with materials such as cereal in finished baits, it retains its toxicity to rodents over a relatively long period of time.

As to physiological properties, coumachlor is an anticoagulant similar to dicumarol. Extensive experiments indicate that when combined in concentrations of 0.025% with suitable bait materials it is effective in controlling commensal rats and mice. When such baits are ingested in daily repeated dosages, their anticoagulant action begins to cause death in 3 to 6 days.

According to the 1952 Annual Report of the Rodent Control Committee, National Pest Control Association, Inc., an average of 9 mean days was required to completely clean out infestations of both Norway and roof rats while an average of 14 mean days was required to eliminate infestations of house mice with coumachlor baits. D. Glen Crabtree, of the U. S. Fish and Wildlife Service, concluded that at concentrations of 0.025% coumachlor in cereal baits ". . . will control commensal rats and mice when employed under conditions conducive to normal bait acceptance and when adequate amounts of bait are exposed."

Unlike some rodenticides used previously in baits, rats and mice do not develop bait shyness to coumachlor. In fact, affected rats and mice frequently continue to feed until they are no longer able to walk to the bait stations.

In an unpublished report, the Hazleton Laboratories show that fowl are less susceptible than mammals although all species of small animals tested were susceptible to the toxic effects of coumachlor when fed sufficient dosages over a period of several days.

Massive quantities of prepared bait must be consumed to induce acute symptoms from a single dose and the hazard from acute poisoning is correspondingly slight.

The hazards to human health involved in the use of coumachlor are much less than with some of the rodenticides previously employed. Since repeated ingestions are usually required to cause death in animals, the likelihood of such ingestions accidentally is remote. However, if hemorrhages result from accidental ingestion by humans, the Committee says that blood transfusions combined with intravenous and oral doses of Vitamin K are indicated.

BHC
(TECHNICAL)

the Kiss of Death

DDT
(TECHNICAL)

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The Kiss of Death is administered surely and quickly to the boll weevil and the boll worm by pesticides formulated with TENNESSEE's Benzene Hexachloride and DDT. Get in touch with TENNESSEE for prompt delivery of your BHC and DDT requirements.

TENNESSEE is also your basic source for Lindane and weed-killing 2,4-D and 2,4,5-T.

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Aerial 2,4,5-T Clears Brush

Arkansas dairymen, following the example of rice farmers who use chemicals to control weeds in rice fields, are clearing new pasture land by spraying herbicides from the air. A total of 15,000 acres probably will be cleared by this method, it is reported.

Paul H. Millar, chief inspector of the State Plant Board, said that six planes belonging to four firms have been licensed to spray brushland aerially, as well as to do other custom spraying. One operator has already cleared more than 1,000 acres by this method, he says.

The landowner pays for the chemicals used — ordinarily 2,4-D or 2,4,5-T or a combination of the two — and a rate per acre for the service. Average cost is about 8 per acre.

The ease with which unwanted scrub oak, hickory, sassafras, persimmon and other brush is removed by spraying is expected to be a boon to pasture development in upland sections of the state, where livestock production is on the increase and more pasture is needed for growing herds.

Custom sprayers doing this work are required to post cash bond with the Plant Board. This bond is forfeited should the Board find it necessary to rescind the operator's permit because of carelessness or violation of regulations. Sprayers are not required to wash out airplane tanks and booms before returning to base unless cotton or other susceptible plants are being grown within one and one-half miles of the line of flight. Cotton growers formerly complained, and on occasion, filed suit to recover damages because their crops had been affected by windblown or carelessly-handled herbicides.

The Plant Board also permits airplane spraying by preparations other than 2,4-D with the proviso that the spray equipment is thoroughly cleaned after use and the owners of crops to be sprayed and owners of adjacent crops have signified in writing that they are fully informed of the facts. In ground applications, the spray boom must be within 18 inches of the top of the plants, and regardless of the proximity or lack of proximity of cotton and other broad-leaved plants, must be canopied to prevent drift. Equipment for ground spraying may not be used within 100 yards of a susceptible crop without the owner's permission.

•

Dr. Wallis to Conn. Station

Dr. Robert C. Wallis has been appointed to the staff of the Connecticut Agricultural Experiment Station, New Haven, as a medical entomologist. He is a specialist in the field of insects as carriers of human and animal diseases.

One of the first problems to be studied by Dr. Wallis is that of the eastern arthropod-borne encephalomyelitis affecting humans and domestic fowl. This project is being carried on cooperatively by the Connecticut Station, the State Dept. of Health and the Department of Animal Diseases, Univ. of Connecticut.

COPPER SULPHATE

ZINC SULPHATE

BORON

TC

MINERAL SALTS

Minerals are just as essential to healthy plant growth and optimum production of vitamin-rich crops as are nitrogen, potash and phosphate. Mineralized fertilizer stimulates sales and creates new business because the results are conclusive. Fertilizers that give superior results are the fertilizers that the growers buy.

As basic producers of minerals, we would like to discuss mineralized fertilizer with you and show you how to increase your fertilizer tonnage and profits by the addition of minerals.

We can supply mineral mixtures to your own specifications in large or small quantities.

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MAGNESIUM SULPHATE

SOLUBLE TRACE MINERALS

Tennessee's trace minerals are soluble and their nutritional value is immediately available to the plant. Soluble trace minerals are more economical and faster acting.

TENNESSEE TRI-BASIC COPPER SULPHATE

COP-O-ZINC NEUTRAL COPPER-ZINC

NU-Z NUTRITIONAL ZINC

TRI-BASIC

TRI-BASIC Copper Sulphate is a chemically stable copper fungicide containing not less than 53% metallic copper. TRI-BASIC Copper Sulphate can be used as a spray or dust on practically all truck crops and citrus crops. Control persistent fungus diseases—correct copper deficiencies from a nutritional standpoint. Use TC TRI-BASIC Copper Sulphate.

COP-O-ZINK

COP-O-ZINK is a new, neutral copper-zinc fungicide containing 42% copper and 11% zinc. COP-O-ZINK gives a superior performance in control of fungus diseases. COP-O-ZINK composition of two essential elements gives it added value in correcting deficiencies of zinc and copper and in stimulating plant growth. COP-O-ZINK is compatable with all inorganic and organic insecticides. No lime is required. For use in spraying or dusting.

NU-Z

NU-Z contains 52% metallic zinc. It is a neutral zinc compound which does not require the addition of lime for direct foliage application. NU-Z gives excellent coverage and adherence to plant foliage, thus rendering it available over a longer period of time. Safe for direct application. For zinc deficiency and plant nutrition—use as a spray or dust.

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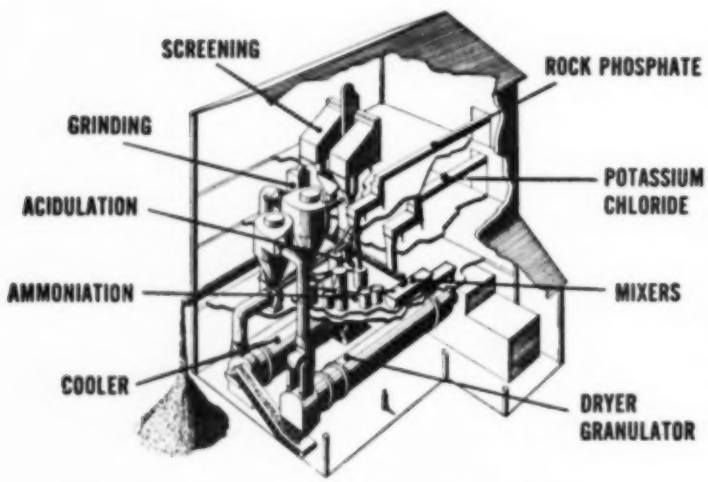
1. The St-Gobain process manufactures granulated fertilizers in one continuous automatic operation. The same equipment can be used to produce various $N\text{-}P_2O_5\text{-}K_2O$ formulae.
2. Can produce end product in any sized granules desired.
3. St-Gobain plants are available in capacities of 30,000 tons of produced nitrophosphates per year and up.
4. You benefit from improvements and experience of many years of successful operation on a large industrial scale.
5. St-Gobain process, with the same equipment, permits the use of either sulphuric or phosphoric acid according to the formula of the required fertilizer.
6. Capital investment is low due to the use of simple equipment.
7. Operating costs are low due to a continuous automatic operation and high yields.



Examples of Formulae Produced by St-Gobain Process

N%	P_2O_5%	K_2O%	
10	10	17	(sulfo-nitric acidulation)
11	11	11	" " "
10	15	20	(phospho-nitric acidulation)
12	15	18	" " "
12	12	20	" " "
14	14	14	" " "
10	20	20	" " "

For complete information write, wire or phone:

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AGENTS FOR ST-GOBAIN PROCESS

TVA Demonstration Slated

All fertilizer manufacturers and other industry representatives have been invited by the National Fertilizer Association to attend a demonstration of a continuous ammoniator developed by the Tennessee Valley Authority as a result of its pilot plant studies on the ammoniation of superphosphates.

Date of the demonstration is September 15 at Wilson Dam, Alabama. The following schedule of events has been planned:

9 a.m., meet in TVA Chemical Engineering building.
10 a.m., demonstration of production of 6-12-12.
12, noon, Lunch.
2 p.m., demonstration of production of 10-10-10.
3 p.m., discussion period.

The new ammoniator is expected to offer some advantages over conventional batch ammoniation equipment, the NFA says.

In making the 6-12-12 grade, ammoniating solution will serve as the sole source of nitrogen in the demonstration; and production of a 10-10-10 grade will be demonstrated, employing sulfuric acid and nitrogen solution addition.

•

"Urab" New Herbicide

General Chemical Division, Allied Chemical & Dye Corp. announced recently successful results on its work with its new weed killer, "Urab." The compound is phenyldimethylurea, and related to the carbamate family of herbicides. It has been produced in experimental quantities over several seasons and is now said to approach commercial availability. It will be offered in several formulations for various applications.

"Urab" is said to be effective in controlling weeds in some crops at dosages as low as one-half pound per acre. Applications of two pounds per acre immediately after cotton, soybeans, corn and wheat were planted gave 95% control of broadleaf weeds and 100% control of grassy weeds with only slight to moderate effect on crop growth. Higher dosages are recommended for eliminating plant growth for extended periods in such areas as highways, railroad right-of-ways, etc. Application at 8 and 16 lbs. per acre gives complete kill of all weed and crop plants.

SUPPLIERS BULLETINS

(Continued from Page 65)

phosphate rock and general methods of manufacture. Of special interest is a description of the manufacture of phosphoric acid and triple superphosphate at the new fertilizer works of Fisons, Limited at Immingham, England. This is Britain's first triple superphosphate plant and has an annual design capacity of 50,000 tons of single superphosphate, 70,000 tons of triple superphosphate and 75,000 tons of granular compounds. Some economic aspects of the Immingham operation are also included.

For a free copy, write to The Dorr Company, Barry Place, Stamford, Conn.

Captain 50-W has been thoroughly tested on many crops and has proved to be a superior fungicide that gives better disease control, increased yields, improved quality and longer storage life.

IT IS RECOMMENDED FOR:

APPLE: Scab, Brook's Fruit Spot, Sooty Blotch, Fly Speck, Bitter Rot, Fruit Rots.
PEACH: Brown Rot and Peach Scab.
CHERRY: Leaf Spot and Brown Rot.
AVOCADO AND MANGO: Cercospora Spot or Blotch.
CURCURBITS: Angular Leaf Spot, Anthracnose and Downey Mildew.
TOMATO: Early Blight, Anthracnose Leaf Spot, Septoria, Late Blight, Stemphyllium.
POTATO: Early and Late Blight.
CARROT: Septoria and Cercospora Leaf Spot.
ROSE: Black Spot.
CELERY (Seed Bed): Damping-Off.
SEED TREATMENT: Seed Rots and Damping-Off.
AZALEA CUTTINGS: Damping-Off.

BASED ON GOOD PRELIMINARY TESTS, CAPTAIN 50-W IS RECOMMENDED FOR TRIAL USE ON:

APPLES: Black Rot (Frog Eye)
PEAR: Pear Scab.
PLUMS: Brown Rot.
PRUNES: Brown Rot.
GRAPES: Black Rot and Downey Mildew.
STRAWBERRIES: Fruit Rot, Leaf Spot.
SPINACH: Downey Mildew.
ONIONS: Downey Mildew.

Write for the latest information on this outstanding new fungicide.

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Paste, Wettable, Dusting, Flowers, Burning

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Wettable, Emulsifiable, and Dust Concentrates—Dust Mixtures
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With 55-56 Baume' Sulphuric: Reduce surface tension by adding UDET F to cut-back water; instantly soluble.

With Phosphoric or Nitric: Reduce surface tension by adding UDET F directly to the acid; instantly soluble.

TYPICAL UDET F RESULTS

1) Reaction between acid and rock is instantaneous.
2) Den time reduced by as much as one-half.
3) Reaction speeded up.
4) Percent insolubles reduced as much as .2% to .3% below normal.
5) The super will mill and screen from 60% to 80% faster.
6) The effects of the UDET F in the super carry over uniformly into the manufacture of mixed goods to give faster curing, softer piles and cake-resistant fertilizer.

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If the phosphates being used have not been acidulated with UDET F, add UDET F to the processing for end result advantages. ½ to ¾ pound conditions one ton of finished fertilizer!

*UDET 90-95F — a powder containing 90-95 percent active
*UDET 50F — a free flowing liquid containing 50 percent active

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Stocks of UDET 90-95F and UDET 50F are now warehoused nation-wide to insure quick delivery.

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Muriate of Potash
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Bailey to International Corp.

L. Horace Bailey, formerly with Thompson-Hayward Co., New Orleans, has joined Hemisphere International Corporation, New Orleans, in charge of its chemical division.

•

Greenkeepers to R. I. Meet

The 22nd annual Greenkeepers' Field Day, sponsored by the Rhode Island Agricultural Experiment Station, New England Golf Associations and the Rhode Island Greenkeepers' Association, is to be held at Kingston, R. I., August 19 and 20.

Speakers scheduled to appear include Carl R. Woodward, president of the University of Rhode Island and experiment station staff members who will discuss soil conditioners, weed control, disease control and reports on the effectiveness of turf fungicides.

An old-fashioned clambake at the Kingston Fair Grounds will be the finale of the first day's session. The second day will be devoted to inspection trips to nearby golf courses.

•

Colloquium Plans Made

Company representatives will discuss new products in the Fungicide Colloquium at the American Phytopathological Society meeting, Madison, Wis., Sept. 7-10. Presentations will include: new fungicides for testing in '54; new fungicides now commercially available or to be ready for '54; improvements on older products or new uses; new fungicides for seed treatment. L. S. Hitchner, NAC, should be given names of participants.

•

California Ag. Group Meets

The Central California Agricultural Forum was scheduled to be held at Fresno State College July 29. The advance program called for panels on "Effectiveness of Pesticides on Major Crops" and another on "Cotton Weed Control". Forum president is O. D. McCutcheon, Hanford, Calif.; vice-president, J. T. Vedder, Bakersfield; secretary, W. D. McClellan, Lindsay, Calif.; and treasurer, G. A. Meyer, Fresno. Program chairmen were C. L. Messec, Fresno and D. N. Wright, Bakersfield.

Appearing on the pesticide panel were Dr. G. F. McLeod, Sunland Industries, Fresno; Gordon L. Smith, University of California; Dick Break, L. R. Hamilton, Inc.; Dr. A. C. Sessions, California Spray-Chemical Corp.; Luther Jones, Dr. Roy F. Smith, and Ed. Swift, all of the University of California; and William Shilling, of Sunkist Growers.

W. A. Harvey, University of California, was moderator of the panel on weed control. Taking part in this were Murray R. Pryor, California Dept. of Agriculture; W. J. Wolgamott, California Electric Weed Service; Chet Conley, Merced County Farm Advisor; Harry Schmall, farmer; H. F. Miller, U.S.D.A.; Robert Drake, Coberly & Plumb, agricultural chemicals; and Richard Price, Mid-State Chemical Supply Co.

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If you use Zinc Sulphate be sure to check
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Technical BRIEFS

Soil Conditioners Evaluated at Rutgers Univ.

A THREE-YEAR program evaluating experimental soil conditioners is currently underway at the New Jersey Agricultural Exp. Sta., Rutgers University, New Brunswick, under the direction of S. J. Toth, associate professor of soils. To date, yield data has been obtained on one crop, with further production data scheduled for late September; observations of crust prevention and depth aggregation, as affected by soil conditioners, are two other phases under consideration.

Products of the following companies are under investigation: Rohm & Haas Co., General Aniline and Film Corp., Allied Chemical and Dye Corp., Catalin Corp of America, Monsanto Chemical Co., Dewey & Almy Co., the B. F. Goodrich Co., as well as the product "Loamium". Applications of all products were made early this spring at the rate of 2000 pounds per acre for depth aggregation. The soil conditioners will be evaluated first of all on the basis of their effect on yield, and secondarily with respect to the longevity of aggregates under standard systems of farming practice.

Red Table Beets harvested recently in Marlboro, N. J., showed a 150% increase in yield where one co-polymer soil conditioner had been used to treat the soil (see illustration). A series of six soil conditioners were used in this test, but harvest data on the other five products, two of which were acrylic and three co-polymers, indicated either no difference in yield as compared with the control, or a marked decrease in yield. The beet crop was grown under standard local farming practice, using overhead irrigation.

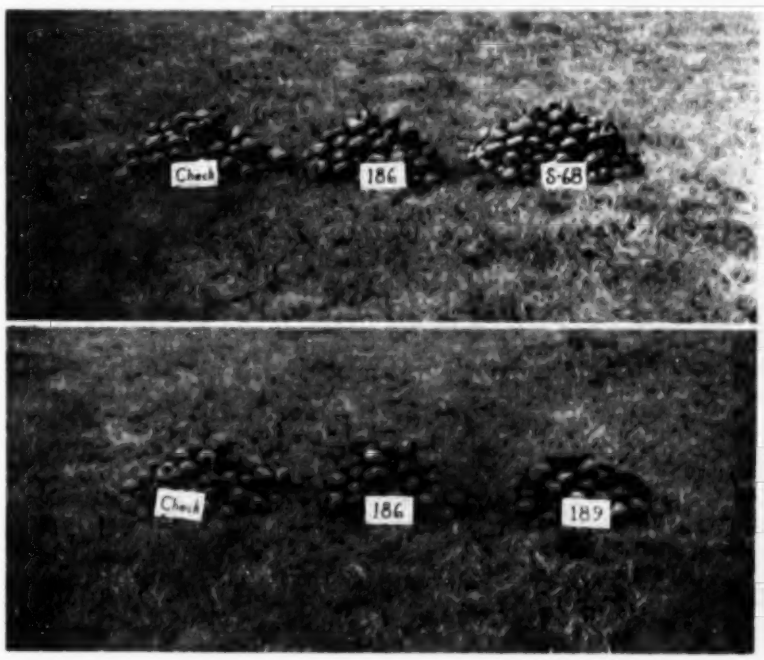
Crust prevention observations in New Brunswick showed a 10 per cent increase in germination for all products listed.

Depth aggregation studies at six inches have shown, thus far, that the acrylates give better germination of small seeds (such as carrots) than do the co-polymers. This is attributed to better retention of moisture at the surface of the soil. Some of the co-polymer soil conditioners indicate better growth of corn than the acrylates, but generalizations cannot be made because of variations in results among the different co-polymers. A marked decrease in germination and growth is noted for some of the products under test, as compared with the control.

Although no results are available as yet, studies are being made of the effect of different clay minerals present in soils and the conditioners. Four New Jersey soils, with varying contents of kaolinite, montmorillonite and illite, are under investigation, using various rates of soil conditioners produced by Rohm & Haas Co., Monsanto Chemical Co., and General Aniline & Film Co.

Dr. Toth indicated that where soils are already in good condition, no improvement in crop yield can be expected from use of soil conditioners. He pointed out however, that advantages of conditioners on such soils may lie in possible rejuvenation of the soil, eliminating the necessity for practicing crop rotation, planting forage crops periodically, etc.

Studies of waste products of the American Viscose Co. are also underway, directed to possible soil conditioner properties. Preliminary indications of these products point toward improvement of water absorb-



Red Table Beets harvested this spring at Marlboro, N. J. test plots, using soil conditioners 186, 189 and S-68. Comparision of total yield shows some increase in plot using product S-68, little variation with 186, and marked decrease with product 189.

ing capacity of the soil. Trials of waste cellophane applications on beans have shown some increase in yield. Applications on corn also show an improvement in growth. Further data on all studies are expected this fall.

•

Smut Control in Grains

Loose smut in the seed of various barley variations is satisfactorily controlled by the following treatments in a temperature range of approximately 72°-77° F.: seed soaked in water for 56 to 64 hours; seed soaked in water for 6, 8 or ten hours, followed by 40, 44, and 48 hours in .2 per cent Spergon suspension; and seed soaked in .2 per cent Spergon suspension for 48 hours with no pre-soak period in water.

In the 56-64 hour water-soak treatments, an odorous decomposition occurs, which is not evident in the Spergon treatments.

Loose smut in Stewart wheat may be eliminated by soaking it in water for 48 hours at the temperature range mentioned above, and by soaking it in .1 per cent suspension for 24 hours. Mortality of healthy seed was severe in the latter treatment. L. E. Tyner, *Phytopathology* 43, No. 6, 313-316, 1953.

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Literature Available

The following list reviews a series of bulletins on fertilizer, insecticide and fungicide recommendations, controls, etc. For the most part, these bulletins and reports are prepared by the various state agricultural experiment stations, and copies may be obtained by writing directly to the respective stations.

Methylenedioxyphenyl Synergists for Insecticides by Neely Turner. Tests for synergism with pyrethrum, rotenone and allethrin; effect of methylenedioxyphenyl synergists on other insecticides; relation between amount of synergist and effectiveness; mode of action of synergists. 24 pages, Bulletin 570, April, 1953. Conn. Agri. Exp. Sta., New Haven, Conn.

Milky Disease for Control of Japanese Beetle Grubs by C. H. Hadley. Discussion of what the milky disease is and how it works . . . how it is used . . . how it compares with chemical insecticides, and its effect in control of the adult Japanese beetle. 8 pages Bulletin EC-4 BEPQ, USDA.

Inspection of Legume Inoculants 1951 and 1952. By F. W. Quackenbush, A. S. Carter, and L. C. Shenberger. Requirements and specifications of the 1937 Indiana law pertaining to inoculants, results of inspection, and tabulated report of inspection of inoculants in 1952 giving result of tests using various products on specific crops. 12 pages, Circular 393, April 1953, Purdue University, Agri. Exp. Sta., Lafayette, Indiana.

The Golden Nematode Control by Soil Fumigation. Fumigants and application; preparation of soil; when to fumigate; treatment of fields; treatment of small plots; decontamination of equipment; necessary precautions. 4 pages. Bulletin EC-28, June 1953. BEPQ, USDA.

INSECTICIDE CONCENTRATES

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Protection of Turf from Damage by Japanese Beetle Grubs by W. E. Fleming. Appearance and habits of the grubs. Injury to grass. Treatment of established turf. Trials with lead arsenate, DDT, chlordane. Treatment of new turf and pastures. Grasses not injured by insecticides. 8 pages. Bulletin No. 290, U.S.D.A.

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DDT for Corn Earworm

Utah studies indicate that a ten per cent DDT dust applied at approximately 30 pounds per acre looks the most promising for corn earworm control in sweet corn. Several materials have been tried as dusts and sprays in recent years, but DDT dust is found to give the best control when applied two or three times at 3 day intervals, starting as soon as any silks appear. W. E. Peay and H. E. Dorst, *Farm & Home Science*, Utah Agricultural Experiment Station, 14, No. 2, 1953.

•

Grasshopper Insecticides

Tests to determine minimum effective dosage of various insecticides in sprays and baits for grasshopper control gave the following results: Aldrin at .5 ounce per acre was unsatisfactory. A dosage of one ounce gave satisfactory kills only in short, green to drying alfalfa. Two ounces was generally satisfactory.

Dieldrin in emulsion tested at dosages of 1,2 and 3 ounces per acre in 1950 showed little difference in the average kills. Heptachlor gave satisfactory kills at dosages of 1,2,3,4,6 and 8 ounces per acre in green to drying alfalfa under cool temperatures. The two lowest dosages were unsatisfactory in drying to dry alfalfa under moderate to high temperatures. Compound 1189 gave satisfactory kills at .75 and 1 pound per acre, particularly when applied during dry, hot weather. CS-708 at a dosage of .75 pounds per acre gave satisfactory kills in green alfalfa, but decreased in effectiveness in drying and dry alfalfa under dry, hot conditions.

Lindane at .5 pounds per acre in emulsion was satisfactory in early spring tests in Arizona, but was unsatisfactory at .5 and .75 pounds under hot, dry conditions in July. Baits containing aldrin, dieldrin and heptachlor at 1 and 2 ounces per 100 pounds of bran gave higher kills than baits containing 4 and 8 ounces of chlordane when spread in green alfalfa in May and June. Baits containing 1 ounce of aldrin per 100 pounds of bran gave a kill of 70 to 75 per cent when spread at ten pounds per acre. There was little difference in the kills obtained between wet and dry bait. O. L. Barnes, F. T. Cowan, E. J. Hinman, N. J. Nerney and L. Seaton U.S.D.A., B.E.P.Q. Bulletin No. E-860.

•

Boron—Nutrient, Herbicide

Annual grasses, for the most part, have only a small boron requirement. When the boron supply is in excess, they may take up as much as 100 times this requirement. This fact has been used to control weeds in canning and sugar beets, when most of the weeds concerned were annual grasses. Borax applied not only helped to control the weeds, but it also supplied the additional boron necessary for maximum yields of beets (Wisconsin tests).

Borax was applied with fertilizer, in some tests; however this method did not give quite as good control. In either case, the weeds were so severely stunted that hand weeding was not necessary.

The method of application of borax does not influence yield response. Slight yield decreases result from high application rates, and poor weed control results from lower rates. Soils tested were all silt or clay loams. K. C. Berger, Univ.of Wisconsin. *Boronogram*, NS 13, News Service of Pacific Coast Borax Co.

•

"Trap Crops" for Fly Pests

The technique of planting "trap crops", such as corn, around fields of crops to be harvested, such as melons or tomatoes, has been found to control the melon fly, a pest that presents some threat to California agriculture. The trap crop and nearby wild vegetation is sprayed with in-

CO_2 FOR NEW PROCESS OF FERTILIZER MFG.

USE of carbon dioxide to convert corrosive, unstable hygroscopic calcium nitrate into calcium carbonate, without separating the calcium nitrate from the mixture is the basis of a new process for making nitrophosphate fertilizers. Production on a commercial scale began this spring in Germany, at Castrop-Rauxel, in a plant operated by Gewerkschaft Victor. Licensing of this process is being handled in the United States by Chemical & Industrial Corp., Cincinnati. The first U. S. plant is expected to go into operation next year.

The new method was discovered and plant-tested by researchers of the French firm, Potasse et Engrais Chemique. They found that by adding small quantities of certain metallic salts before ammoniation of the nitric acidulated phosphate, the pH of the mixture could be taken to 9 or higher without reversion to citrate-insoluble phosphates. The strongly alkaline ammoniated slurry can then be treated successfully with carbon dioxide.

The general production schedule is: acidulation, ammoniation and stabilization, granulation, drying and screening. Desired product particle size is in the range of 2 to 4 mm. Fines are returned to the granulator; oversize is ground and recycled. The process operates continuously. Details of construction haven't been revealed, but it is reported that each of the units has several agitator shafts. Special design avoids the formation of foam, even with uncalcined phosphate rock.

Stabilization with CO_2 has the advantage of using a material which is readily available as a waste product from the ammonia operations. Another attractive feature of the carbon dioxide process is the wide range of fertilizer compositions which can be made. There is no minimum ratio of nitrogen to phosphorus which must be maintained. *Chemical Engineering* 60, No. 6, 115-116, August 1953.

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secticides. This control method offers the further advantage of eliminating direct treatment of crops for harvest with poisonous insecticides.

The technique takes advantage of a peculiar habit of the melon flies. The insects enter the fields for only short periods during the day to lay eggs among the crop plants and fruits. They then return to plants surrounding the field, where they spend most of their time. *Science New Letter*, July 11, 1953.

•

Control for Pea Aphids

Following an infestation of pea aphid in Kansas alfalfa fields, tests on control in 1952 indicated that metacide, parathion, systox, DDT and endrin gave good results. Endrin is not available to the farmer. Metacide and systox are not safe enough to use; therefore, DDT is the only control available to the farmer.

Plots treated with these insecticides yielded 2 to 2.5 times the check plot. W. W. Franklin *J. Economic Entomology* 46, No. 3, p. 467 (1953).

•

Methoxychlor for Beetles

DDT resistant potato beetles are being controlled on Long Island potato crops by use of methoxychlor.

Resistance to DDT began late last season, and a series of tests on several insecticides were started immediately at the Long Island Vegetable Research Farm, operated by Cornell University. Methoxychlor proved one of the best insecticides tested.

Methoxychlor should be added to each spray application right through the season. This keeps an adequate deposit of chemical on older leaves and also protects new growth. Being a residual insecticide, methoxychlor continues to kill insects for some time after spraying.

It is safe for handling by sprayers and has already found its major uses where maximum safety is required. Methoxychlor is said to control not only the Colorado potato beetle, but also leafhoppers and flea beetles, which are serious potato pests. The usual recommendation for potatoes is two pounds in 100 gallons of spray for each acre.

NEW BOOKS

Insect Physiology — edited by K. D. Roeder. Published by John Wiley & Sons, Inc., New York. 1100 pages, 6 x 9 inches, cloth binding, price $15.00.

This text containing contributions by fifteen specialists in various fields concerned with insect physiology, summarizes and evaluates the major trends in experimental research on insects. Included are sections on respiratory metabolism and mechanism, function and structure of the alimentary system; digestion; nutrition; excretion; electric activity in nerves and ganglia;vision; flight muscles; insect behaviour; insect development; role of hormones in molting and metamorphosis; and mode of action of enzyme inhibitors. The text is well illustrated, and contains a complete bibliography.

* * * *

Cellulose, the Chemical that Grows — by Williams Haynes.. Published by Doubleday & Company, Inc., New York. 386 pages, 6 x 9 inches, cloth binding, price $4.00.

This text presents "the story of cellulose", considering the scientific complexities in an interesting, understandable manner. The chemical background and production of cellulose, is presented, along with discussions of the varied applications of this material, as in plastics, chemical cotton, wood cellulose, film, fabrics and fibers, etc. About fifty photographs provide fine illustrations of the processes and materials discussed.

The book is well written and edited, discussing one of the widely used materials of this day in a practical manner.

* * * *

Pesticide Handbook by D.E.H. Frear. Published by College Science Publishers, State College, Pa. 204 pages, 6 x 9 inches, price $1.25.

The 1953 edition of this handbook contains more than 5000 trade named pesticides, with information on their active ingredients, manufacturers and uses. It contains all the features of the previous four editions, and includes also a list of pest control operators.

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INDUSTRY *Patents*

The information below is furnished by patent law offices of

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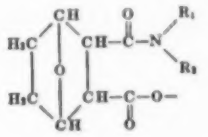
The data listed below is only a brief review of recently issued pertinent patents obtained by various U. S. Patent office registered attorneys for manufacturers and/or inventors. Complete copies may be obtained direct from Lancaster, Allwine & Rommell by sending 50c for each copy desired. $1.00 for Canada. They will be pleased to give you free preliminary patent advice.

2,637,624. GRAIN STERILIZING DEVICE. Patent issued to Herbert R. Klink, Roanoke, Va., May 12, 1953. A device for separating insects from grain comprising a container, a crank means for causing the container to be gyrated, a screen disposed at the top of the container for receiving the grain with the insects therein, said screen being adapted to pass the insects, an insect-destroying means lying beneath the screen to receive the insects, said insect-destroying means including imperforate channel slots, and ball weights traversing said slots to crush the insects therein, said balls being rolled through the channel slots as a result of the motion of the container, said channel slots being shaped for conforming engagement by said rolling balls.

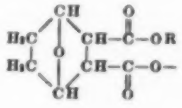
2,637,639. 2-METHYLCHLOROPHENOXYACETATE HERBICIDES. Patent issued May 12, to Frank Talbot and Reginald T. Foster, Widnes, England, assignors to Imperial Chemical Industries, Ltd. A composition of matter containing a 2-methylchlorophenoxyacetate which is capable of giving a physically stable concentrated solution upon being dissolved in water, said composition comprising at least 65% by weight of a water-soluble salt of 2-methyl-4-chlorophenoxyacetic acid together with free alkali in amount equal to from 1.8% to 6% of the weight of the said salt.

2,637,640. PLANT GROWTH REGULATION. Patent issued May 12, to Nathaniel Tischler, Palmyra, N. J., assignor to Sharples Chemicals, Inc. A plant response composition comprising a salt of a strong mineral acid with at least one of the group consisting of ammonia, alkyl amines, alkanol amines, and mixed alkylalkanol amines, and at least one water-soluble compound the anion portion of which is of exo-cis configuration and conforms to the structure



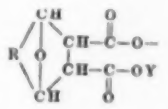
in which R_1 and R_2 taken individually represent one of the group consisting of the hydrogen atom and alkyl, alkanol, and cycloalkyl radicals, and taken collectively represent one of the group consisting of polymethylene and oxapolymethylene radicals.

2,637,641. PLANT GROWTH REGULATION. Patent issued May 12, 1953, to Nathaniel Tischler, Palmyra, N. J., assignor to Sharples Chemicals, Inc. A plant response composition comprising a salt of a strong mineral acid with at least one of the group consisting of ammonia, alkyl amines, alkanol amines, and mixed alkylalkanol amines, and at least one water-soluble compound the anion portion of which is of exo-cis configuration and conforms to the structure



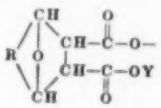
in which R represents an alkyl radical selected from the group consisting of primary and secondary alkyl radicals having from 1 to 8 carbon atoms.

2,637,642. PLANT RESPONSE AGENTS. Patent issued May 12, 1953, to Nathaniel Tischler, Palmyra, N. J., assigor to Sharples Chemicals, Inc. A composition prepared for use as a plant response agent which comprises a compound selected from the group consisting of saturated, open-chain, carbon-to-carbon linked, mono- and dihydroxy, mono-, di- and tricarboxylic acids having from 2 to 6 carbon atoms, and the salts of said acids with at least one of the group consisting of ammonia, alkyl amines, alkanol amines and mixed alkylalkanol amines; and a compound which when in the presence of water yields anions having the configuration



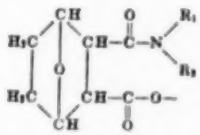
in which Y represents one of the group consisting of an unsatisfied valence and a cation, and in which R represents one of the group consisting of the vinylene radical and the ethylene radical.

2,637,643. PLANT RESPONSE AGENTS. Patent issued May 12, 1953, to Nathaniel Tischler, Palmyra, N. J., assigor to Sharples Chemicals, Inc. A composition prepared for use as a plant response agent which comprises a compound selected from the group consisting of diglycolic acid and the salts of said acid with at least one of the group consisting of ammonia, alkyl amines alkanol amines and mixed alkylalkanol amines; and a compound which when in the presence of water yields anions having the configuration



in which Y represents one of the group consisting of an unsatisfied valence and a cation, and in which R represents one of the group consisting of the vinylene radical and the ethylene radical.

2,637,644. PLANT GROWTH REGULATION. Patent issued May 12, 1953, to Nathaniel Tischler, Palmyra, N. J., and Ernest P. Bell, Detroit, Mich., assignors to Sharples Chemical, Inc. A composition prepared for use as a plant response agent which comprises a carrier, and at least one compound which when in the presence of water yield anions of exo-cis configuration and conforming to the structure



in which R_1 and R_2 taken individually represent one of the group consisting of hydrogen and alkyl, alkanol, and cycloalkyl radicals, and taken collectively represent one of the group consisting of polymethylene and oxapolymethylene radicals.

2,637,645. PLANT GROWTH REGULATION. Patent issued May 12, 1953, to Nathaniel Tischler, Palmyra, N. J., and

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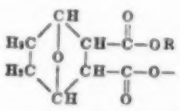
Ernest P. Bell, Detroit, Mich., assignors to Sharples Chemicals, Inc. A method for inducing response in a living plant having a vascular system, comprising bringing into association with said vascular system of said plant an effective amount of anions of exo-cis configuration and conforming to the structure



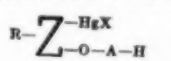
in which R represents an alkyl radical selected from the group consisting of primary and secondary alkyl radicals having from 1 to 8 carbon atoms.

2,637,646. DEFOLIANT COMPOSITION. Patent issued May 12, 1953, to Milton Kosmin, Dayton, Ohio, assignor to Monsanto Chemical Co., St. Louis, Mo. A plant defoliant comprising an oil-in-water emulsion of 2-allylmercaptobenzothiazole as the active ingredient.

2,637,647. HERBICIDAL COMPOSITIONS. Patent issued May 12, 1953, to Milton Kosmin, Dayton, Ohio, assignor to Monsanto Chemical Co., St. Louis, Mo. A herbicidal composition comprising an oil-in-water emulsion of 2-vinylmercaptobenzothiazole, said thiazole being present in said emulsion in a quantity which is toxic to plant life.

2,637,676. INSECTICIDAL AEROSOL COMPOSITIONS Comprising a 1, 1, 1,-trichloro-2, 2-Bis (ethoxy methyl phenyl) ethane in a chloro-fluoromethane. Patent issued May 12, to Louis A. Mikeska, Westfield, N. J., assignor to Standard Oil Development Co. An insecticidal composition of superior knockdown characteristics consisting of a homogeneus liquid solution of a compound selected from the group consisting of 1,1,1,-trichloro-2,2-(4,4' - diethoxy - 3,3' - dimethyldiphenyl)-ethane and 1,1,1-trichloro-2,2-(3,3'-diethoxy - 4,4'-dimethyldiphenyl1)-ethane in a chlorofluoromethane.

2,637,677. ARYL MERCURIC FUNGICIDE AND THE METHOD OF USING THE SAME. Patent issued May 12, 1953, to Robert A. Dinerstein, Park Forest, Ill, assignor to Standard Oil Co., Chicago, Ill. As a new composition of matter, a liquid water-solution aryl mercuric salt having the general formula where Z is an aromatic



nucleus selected from the class consisting of benzene and naphthalene, X is an acid radical, R is a nuclear substituent selected from the class consisting of hydrogen and an aliphatic radical having from 1 to 18 carbon atoms, and A is a polyoxyalkylene ether chain containing oxyalkylene groups selected from the class consisting of oxy-ethylene and oxy-propylene.

2,637,678. AEROSOL GENERATING AND PROPELLING COMPOSITION AND INSECTICIDE. Patent issued May 12, 1953, to Kenneth C. Peer, San Francisco and Llewellyn W. Fancher, Lafayette, Calif. An aerosol generating and propelling composition for use in dispersion of materials capable of being transported and dispersed in an aerosol, comprising, the following reagents in approximately the following proportions:

	Parts
Potassium nitrate	2
Sulfamic acid	1 to 1.5
Thiourea	0.5 to 1

2,639,231. FERTILIZER PROCESS AND PRODUCT. Patent issued May 19, 1953, to Ernest A. Snow, Jr., Amherst, Mass. The method of making a complete fertilizer base containing in available form the primary, secondary and also the trace elements essential to plant growth which comprises combining relatively small weights of ammonium chloride and a soluble ferrocyanide with a relatively large weight of sea water and in the presence of a reaction inducing weight of alcohol to derive a precipitate; separating, drying and grinding said precipitate; combining the precipitate with an equal or lesser weight of sewage sludge and in the presence of a sludge digesting weight of concentrated sulfuric acid; combining with the precipitate and sludge a similar acid neutralizing weight of a ground phosphate;

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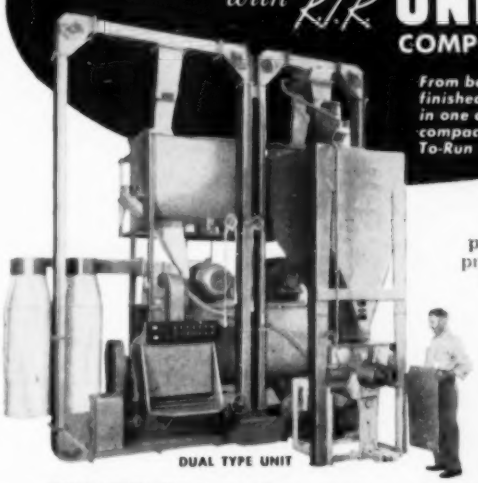
From base materials to finished product in one complete, compact, Ready-To-Run Unit.

*R.T.R.— Ready-To-Run U. S. Pat. No. 2,591,721



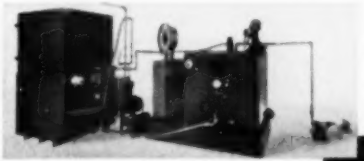
DUAL TYPE UNIT

Many of the largest insecticide producing companies and smaller processors alike have substantially increased production, improved quality and reduced production costs with these factory-tested units. These Ready-To-Run plants mix, blend and package dry, free flowing, powdered materials, including many formulas involving liquid impregnation.

DUAL TYPE: Performs three processes of production: 1) Mixes, blends and packages dry, free-flowing powdered materials. 2) Compounds finished products from ingredients requiring reduction in particle size. 3) Compounds finished products from ingredients involving liquid impregnation.

STANDARD TYPE: Mixes and blends dust concentrates with diluents to produce and package field strength insecticides of consistently uniform superior quality.

Both Dual and Standard Units handle 40 cu. ft. batches



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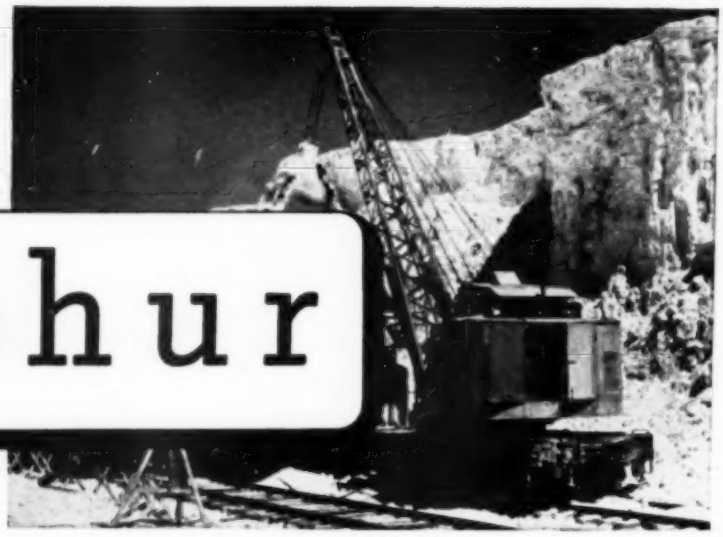

Sulphur

Thousands of tons mined daily, but where does it all go?

Did you ever have the misfortune on a steaming, sticky, sultry day to sit it out on a crowded parkway, bumper to bumper, waiting for traffic to clear? No doubt your thoughts were plenty sulphurous but probably not along the lines we have in mind.

We're thinking of the mineral Sulphur and its link with the automobile. Each car accounts for a substantial poundage of Sulphur, some estimates put it at around 25 pounds for the average car. Give or take 5 pounds, it shows that a tremendous tonnage of Sulphur is needed each year to put cars, buses and trucks on the road ready to operate. And don't forget the tire and battery replacements going on every day.

Sulphur enters the automobile picture through the tires, steel sheets, plated and plastic fittings, glass, battery acid and parts, copper tubing and wiring . . . all of which call for the use of Sulphur or its compounds in connection with their manufacture.

Can you wonder that Sulphur goes into industry just about as fast as the sulphur producers of the Gulf Coast Region can get it above ground and cooled preparatory to shipment?

Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.

Sulphur Producing Units: Newgulf, Texas • Moss Bluff, Texas
Spindletop, Texas • Worland, Wyoming

adding thereto a relatively larger weight of dried sewage sludge: and drying and grinding the final product.

2,639,836. SEED TREATER. Patent issued May 26, 1953, to Claude C. Calkins, Spokane, Wash., assignor to Calkins Mfg., Spokane, Wash. In a machine for treating seeds, a tank for seed treating slurry, an agitator shaft in the tank, agitators on said shaft, a slurry pan having an outlet, a metering cup movable alternately into and out of filling position beneath the outlet from the pan, a flexible drive member extending beneath the shaft and operably connected to said shaft to rotate the shaft, the flexible drive member extending upwardly from the shaft on opposite sides of the pan and extending over the pan, power means for driving the drive member, buckets on said member which are filled with slurry as the member passes beneath the agitator shaft, and means to dump the buckets as they pass over the pan.

TRADE MARK APPLICATIONS

COROSUL "S", in capital letters, for fungicide for control of plant diseases. Filed Nov. 12, 1952, by Pittsburgh Plate Glass Co., Pittsburgh, Pa. Claims use since August 25, 1950.

REAL-GREEN, in hand-lettered capitals, for insecticides, fungicides used as a plant spray. Filed Aug. 4, 1952, by Cook Chemical Co., Kansas City, Mo. Claims used since July 21, 1952.

GY-ZIP, in Italic capitals, for preparation for destroying insects and vermin. Filed Apr. 17, 1951, by Geigy Company, Inc., New York. Claims use since Feb. 12, 1951.

TPC, in hand-lettered capital letters, for chemical products including insecticides, wood preservers, fungicides. Filed Feb. 2, 1951, by Tennessee Products & Chemical Corp., Nashville, Tenn. Claims use since Aug. 1, 1930.

K-6451, for p-Chlorophenyl p-Chlorobenzenesulfonate used principally as an ingredient of parasiticidal composition. Filed Jan. 26, 1953, by Dow Chemical Co., Midland, Mich. Claims uses since May 27, 1949.

D-CRAB, in capital letters, for crabgrass and weed killer. Filed June 24, 1952, by the Terre Co., Rochelle Park, N. J. Claims use since June 6, 1952.

WARFARIN, as part of drawing showing rat eating from tray and saying, "It kills me, but I love it!", for rat and mouse poison. Filed Aug. 8, 1951, by Wisconsin Alumni Research Foundation, Madison, Wisconsin. Claims use since July 26, 1951.

ISOGAM, in capital letters, for chemical ingredient used in insecticides, insect repellents and parasiticides. Filed Feb. 15, 1952, by Sels et Produits Chimiques S.A., Brussels, Belgium. Applicant claims ownership of Belgian registration dated Feb. 12, 1948.

KEM-KUT, in capital letters, for chemical preparation designed to be used to reduce the growth of grass and plants. Filed Oct. 23, 1952, by Loamium Co. of America, Harrison, N.J. Claims use since Sept. 10, 1952.

COROMERC, in hand-lettered style, for fungicide for control of plant diseases. Filed Nov. 12, 1952, by Pittsburgh Plate Glass Co., Pittsburgh, Pa. Claims use since Apr. 5, 1952.

COROSUL "D", in capital letters, for fungicide for control of plant diseases. Filed Nov. 12, 1952, by Pittsburgh Plate Glass Co., Pittsburgh, Pa. Claims use since Aug. 16, 1950.

DRAWING OF GLOVE WITH LETTERS, "Green Thumb" inscribed thereon, for fertilizer, soil conditioners, humus and soils mixed with such materials. Filed Sept. 19, 1952, by Green Thumb Products, Toledo, Ohio. Claims use since Apr. 3, 1951.

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For combating pests in cotton, fruit, truck, cereal and forage crops, Barden Clay is the choice of leading formulators throughout the country. Barden-containing sprays and dusts are delivering superior control with Lindane, Malathon, Chlordane, DDT, Parathion, Endrin, Dilan, Pyrenone and all modern pesticides...for Barden Clay combines top quality with considered economy.

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DUST CONCENTRATES—With fine particle size, high adsorption, lowest abrasion and lowest cost, Barden provides maximum economy with less maintenance and fewer shut-downs for repair.

FIELD DUSTS—For maximum deposit and retention, lowest duster-abrasion and medium bulk density, Barden out-performs all other diluents.

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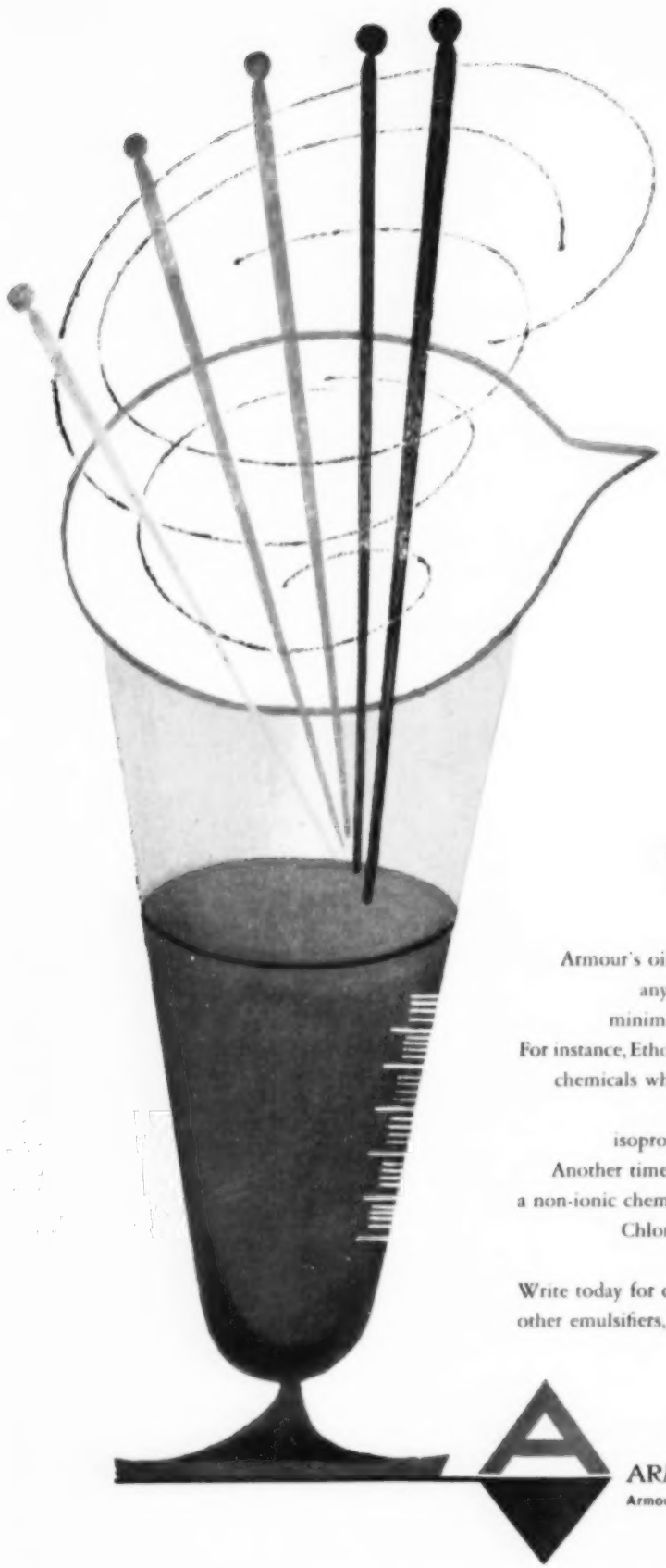

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Armour's oil-soluble, water-dispersible Etho-chemicals solve any emulsification problem faster and easier with a minimum of agitation—and the emulsions last longer. For instance, Ethomeen S/12 and Ethomeen S/15, mildly cationic chemicals which are not affected by water hardness, combine to form an excellent emulsifier for 2,4-D isopropyl ester, even in extremely low concentrations. Another time- and work-saving emulsifier is Ethofat 142/20, a non-ionic chemical for use with kerosene or xylol as a solvent. Chlordane can be emulsified directly into water with this chemical, without the use of a solvent. Write today for complete information about these and Armour's other emulsifiers, including formulas, methods of use, and prices.

ARMOUR CHEMICAL DIVISION
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300 Attend S. C. Fertilizer Meeting

OVER three-hundred fertilizer dealers, manufacturers, and salesmen operating in South Carolina attended the annual fertilizer meeting at the Pee Dee Experiment Station, Florence, South Carolina on July 16.

The entire morning was devoted to touring the grounds of the Experiment Station. The group was transported by trucks fitted with benches and ladders for mounting and dismounting, provided through courtesy of the fertilizer manufacturers operating in the Florence area. The guests took special interest in observing plant food deficiency symptoms, fertilizer experiments, breeding and variety tests and results with various insecticides in controlling cotton and tobacco insects.

After the morning tour, the group had a barbecue lunch and heard brief talks by outstanding agricultural leaders. B. D. Cloaninger, Head of Department of Fertilizer Inspection and Analysis, Clemson College, presided over the meeting. Florence's Major J. R. Shipman welcomed the group; and State Senator W. Clyde Graham of Pamplico praised the work of the experiment station.

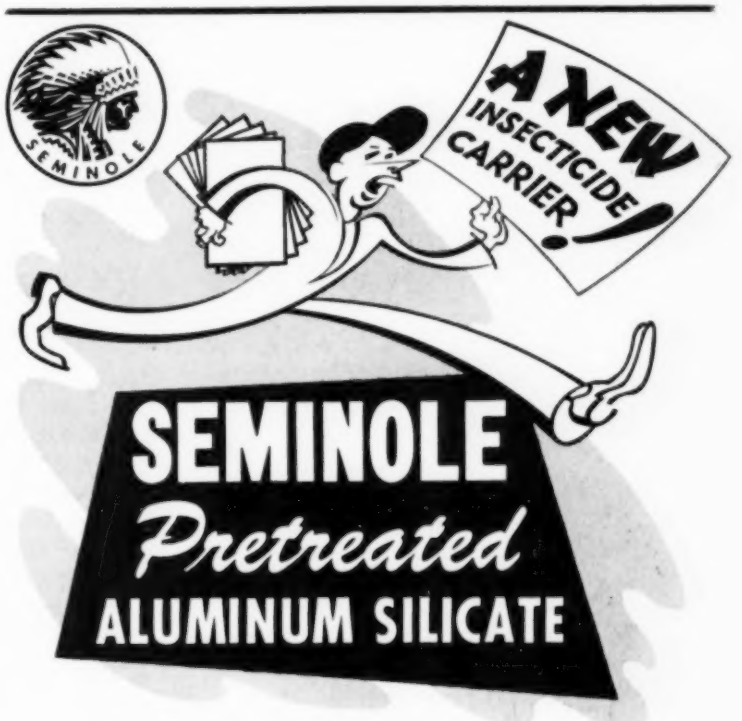
Farmers, he said need definite information and the station has the knack of teaching the things most necessary to be learned.

Dr. R. F. Poole, president of Clemson College, said the gathering has two purposes: first, to let the fertilizer men know what Clemson is doing to expand the knowledge and use of fertilizer; and to give them an opportunity to criticize that work and make suggestions for other efforts. He invited such suggestions.

J. B. Douthit, trustee of Clemson College, chairman of the Agricultural Experiment Station Board of Control, and prominent farmer, spoke briefly and expressed his appreciation to those in attendance. He also stated that Clemson College is most anxious to cooperate with the fertilizer industry and other agricultural agencies in making for a more progressive program in South Carolina.

Paul T. Truitt, president, American Plant Food Council, lauded the cooperative spirit existing between agricultural agencies and the fertilizer industry and pledged the continued full cooperation of the Council toward achieving agricultural goals. Mr. Truitt accompanied one of the four groups on trucks to each point of interest on the experiment station and commented on the excellent work being done at the Pee Dee Experiment Station, one of the branch stations of the South Carolina Experiment Station, under the supervision of the Clemson Agricultural College.

D. W. Watkins, director of



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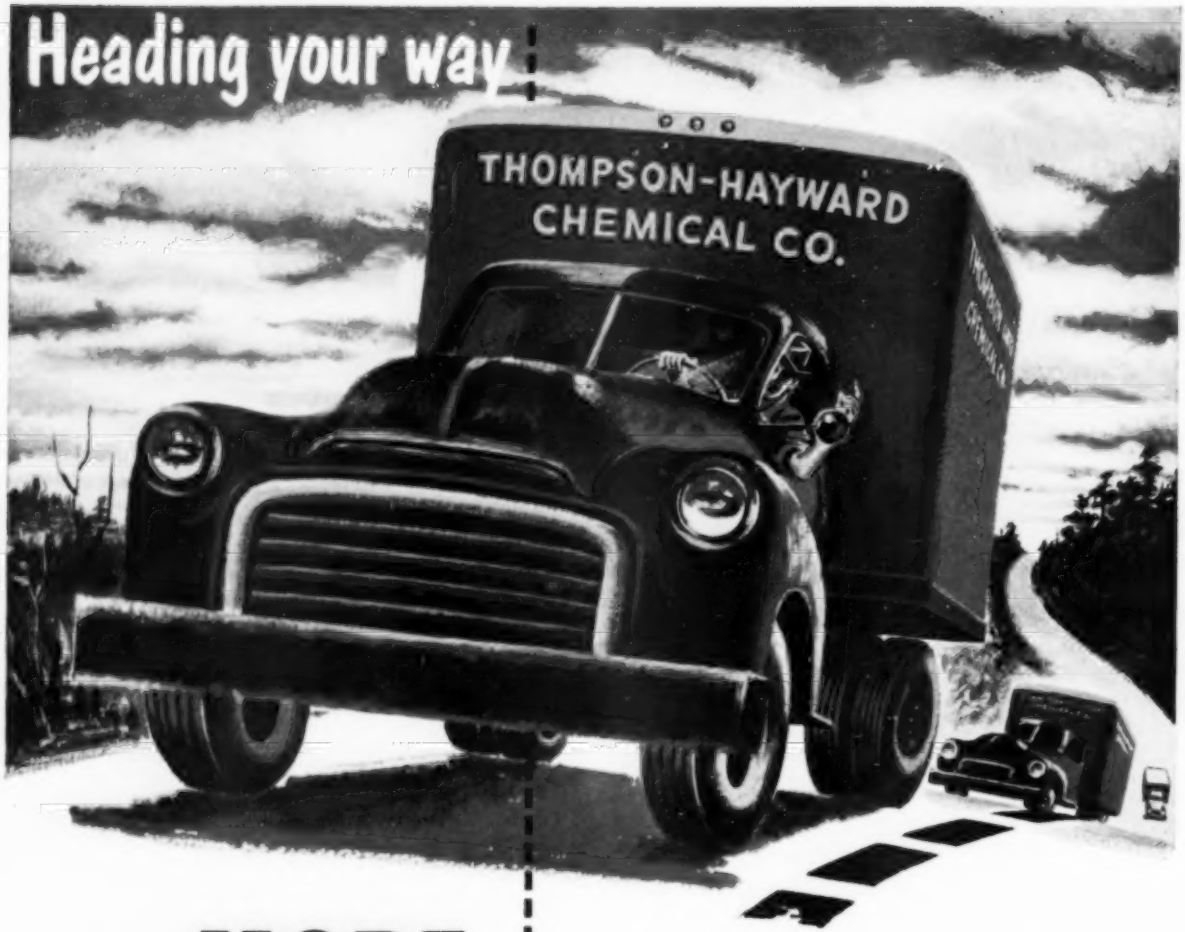

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Availability's what counts in pesticide chemicals. Near-at-hand stockpoints – fast, sure delivery saves time and profits. Eighteen warehouses and a fleet of fast trucks serve the mid-states north and south! If you want your order when you want it, buy Thompson-Hayward.

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Clemson Extension Service, told the audience that the extension service seeks to carry to the farmer results of research and teaching at the college and the stations. One means of this, he explained, is the result demonstrations carried out on scattered farms to show what can be done with scientific methods.

Director Watkins said; "We have the best prospects for a cotton crop since 1948, provided we can control the weevils and worms for the next month."

In this connection, L. M. Sparks, Clemson Extension Specialist, cotton, insects and diseases, reported that boll weevils are out of the hibernation period after a dry month of May delayed them and a warm wet June speeded them into action. The first generation from hibernation is nearing the peak in the Piedmont section, he continued, and in the coastal areas the second generation is on the way. Reports indicate, Mr. Sparks said, that poisoning has slackened all over the state. He urged that farmers be warned against halting the practice now before control is achieved.

Dr. H. P. Cooper of the South Carolina Experiment Station commented that were it not for plant food provided by the fertilizer industry, crop yields would be extremely low. Dr. Cooper stated that one of the problems facing the fertilizer industry is bolstering various grades with minor elements.

J. T. Lazar, District Extension Agent of Florence, in discussing work done by the Pee Dee Experiment Station, stated the workers at the experiment station are the "unsung heros" in this area.

Dr. R. A. Mays, state veterinarian, pointed out that South Carolina is fortunate in having had no serious outbreak of a hog disease similar to foot and mouth disease in cattle and Herman P. Lynn, assistant extension agricultural engineer, gave a brief report on farm irrigation studies.

Tobacco test plots in Darlington and Florence Counties showed irrigated plantings brought heavier yields and higher prices than the dry fields, he said. One plot, not irrigated as the check on an irrigation experiment, was a total failure and could not be used for comparison, due to continued drought. The irrigated plot produced 1,831 pounds to the acre and sold for an average of $59.90 a hundredweight. He cited results also on sweet potatoes, corn and cotton.

Mr. H. A. Woodle, Leader, Extension Agronomy Work, spoke on the importance of fertilizer placement. He stated that each year farmers throughout the state had secured bad stands as a result of improper fertilizer placement. In other words, the seed and fertilizer were placed too close together. On the morning tour, J. H. Anderson, Extension Agricultural Engineer, South Carolina Experiment Station, had on display a tractor with the proper fertilizer and planting equipment which showed clearly the distance the fertilizer

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For over sixty years Triangle Brand Copper Sulphates in various forms have been the standard of quality for agricultural chemicals.

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Dusts are most effective when prepared with Triangle Brand Basic Copper Sulphate and the proper diluent. No lime is necessary. Concentrations of from 7-10% copper can be maintained.

Fertilizers with Triangle Brand Copper Sulphate added in their formulation will provide the necessary amount of this element vital to better crops.

Triangle Brand Copper Sulphate is available in Large and Small Crystals, Superfine (new snow form), and the 'Instant' (powder) forms which contain 25.2% metallic copper. Triangle Brand Basic Copper Sulphate is available in powder form (average particle size is 2 microns) and contains 53% metallic copper.

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PARATHION Originally developed by Farbenfabriken Bayer and now manufactured in this country by Chemagro Corporation, parathion is an insecticide of established effectiveness and constantly widening use.

SYSTOX* Common name of active ingredient: demeton. A systemic insecticide, revolutionary in its mode of action. Highly effective against sucking plant pests such as aphids and mites. Used commercially with outstanding success on cotton and in widespread tests on various other crops in 1952. The potential usage and economic importance of SYSTOX appear very large.

NITROX* Common name of active ingredient: methyl parathion. NITROX appears effective against bollweevil, aphids, mites and thrips on cotton. In combination with DDT protection against bollworm and pink bollworm is also indicated. No other insecticide appears to offer protection against so wide a range of cotton insects.

METACIDE* A mixture of parathion and methyl parathion in a special emulsifier which has the property of reducing the skin toxicity of the liquid concentrate. Highly effective against a wide range of insects on many crops.

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should be from the seed and the depth below the seed.

Dr. W. R. Paden, acting head, Department of Agronomy, South Carolina Agricultural Experiment Station, Clemson, stressed the importance of minor element problems, essential to successful agriculture. He stated that "while we continue to give proper attention to the major elements, nitrogen, phosphorous, and potassium, and also the secondary elements, calcium, sulfur and magnesium, we cannot neglect the minor nutrient elements, such as boron, molybdenum, copper, iron, manganese, zinc and cobalt." The first two of these elements, boron and molybdenum are required for plant growth only, he pointed out. The next four, copper, iron, manganese and zinc, are required by both plants and animals and the latter element, cobalt, is recognized as being required for animals only.

Dr. G. G. Rohwer and Dr. Woodrow O. Owens of Macon, Georgia and Florala, Alabama, respectively with the U.S.D.A., B.E.P.Q., spoke of the control of the white fringed beetle. These talks were regarded as timely in view of the fact that several areas in South Carolina in the vicinity of Florence have been infested with this pest. A watermelon slicing terminated the day's meeting.

Many out-of-state guests were in attendance. These included:

Clark Ballamy, Acme Fertilizer Co., Wilmington, N. C.; Frank E. Boyd, V. C. Chemical Corp., Montgomery, Alabama; L. Ralph Boynton, U. S. Potash Co., Atlanta, Ga.; Edward F. Carnell, The Davison Chemical Corp., Savannah, Ga.; E. N. Carvel, Valliant Fertilizer Co., Laurel, Del.; W. S. Dennis, International Minerals & Chemical Corp., Raleigh, N. C.; W. T. Dible, International Minerals & Chemical Corp., Chicago, Illinois; Carl F. Eborn, Ashcraft-Wilkinson Co., Decatur, Ga.; W. A. Maddox, Jr., Southwest Potash Corp., Atlanta, Ga.; Henry Maddux, Synthetic Nitrogen Products Corp., Raleigh, N. C.; O. B. Majors, Swift & Company, Plant Food Division, Rockingham, N. C.; Dr. H. B. Mann, American Potash Institute, Washington, D. C.; Richard R. Mehrhof, Bradley and Baker, Jacksonville, Fla.; R. S. Moore, Planters Fertilizer & Phos. Co., Statesville, N. C.

Dr. Russell Coleman, The National Fertilizer Association, Washington, D. C.; James A. Naftel, Pacific Coast Borax Company, Auburn, Alabama; Woodrow O. Owen, Bureau of Entomology, Florala, Alabama; Ed Parker, Spencer Chemical Company, Atlanta, Ga.; C. R. Pineda, (Service Técnico Agricola de), Nicaragua, South America; J. J. Pointer, Smith-Douglass Co., Inc., Wilmington, N. C.; J. M. Rawlings, F. S. Royster Guano Co., Montgomery, Alabama; Roger W. Roth, Velsicol Corp., Chicago, Ill.; Dr. G. G. Rohwer, U. S. D. A. Bureau Entomology, Macon, Ga.; O. H. Stanard, American Limestone Co., Raleigh, N. C.; Dr. R. P. Thomas, International Minerals & Chemical Corp., Chicago, Ill.

Paul T. Truitt, American Plant Food Council, Washington, D. C.; C. J. Watts, Jr., Naco Fertilizer Co., Wilmington, N. C.; Albert Woods, Potash Company of America, Washington, D. C.; R. L. Ashley, Jr., Armour Fertilizer Works, Rockingham, N. C.; A. M. Morris, Cooperative Fertilizer Service, Lumberton, N. C.; L. D. Veach, Farmers Cooperative Exchange, Lumberton, N. C.; and R. V. Willard, Cooperative Fertilizer Service, Lumberton, N. C.

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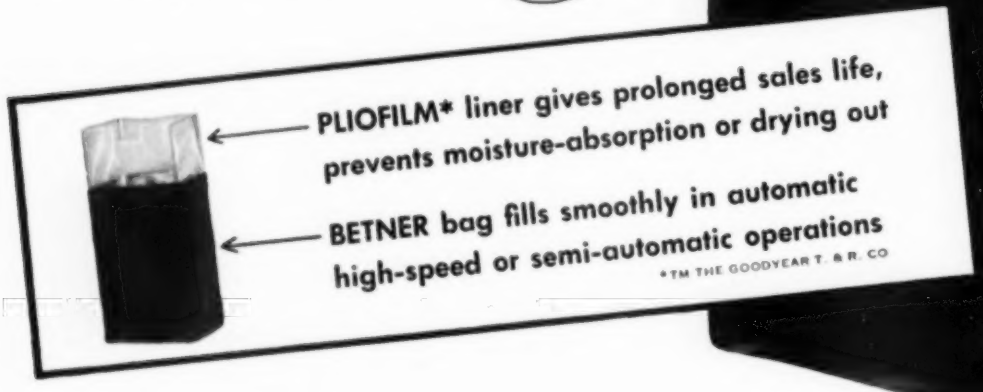
Let us show you what Flav-O-Tainer can do for you. And ask about Continental's Tailor-Made Package Service which makes available the finest in engineering and research.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To Entomological Post

WILLIAM G. HART

Virginia Smelting Company, West Norfolk, Virginia, has announced the appointment of William G. Hart, entomologist, to its technical staff.

Mr. Hart is a native of Rhode Island. He received his B.S. degree in entomology from the University of Rhode Island in 1951 and his M.S. degree from the same school in 1953. He is a veteran of World War II, serving in the Medical Corps, U. S. Navy for 3½ years.

Before his recent appointment, Mr. Hart was State Entomologist for the Rhode Island Department of Agriculture. During the summer of 1951, he worked with the U.S.D.A. Forest Division at New Haven, Connecticut. Mr. Hart will make his home in Portsmouth, Virginia.

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C.F.A. Plans Nov. Meeting

Sidney H. Bierly, secretary of the California Fertilizer Association, Los Angeles, has announced that members and friends of the association who expect to attend the group's 30th annual convention should be making their reservations now. The meeting, scheduled to be held November 9 & 10, will be at Carmel, Calif., with the hotel La Playa as headquarters. Reservations are being made through the hotel's manager, Morgans V. Hilborg.

The program committee, under the chairmanship of Weller Noble, is reported to be securing outstanding speakers for the business sessions of the convention and the entertainment committees are also busy arranging for golf and other recreations for CFA members and their wives. The program will be announced later.

V-C Plans New Ohio Plant

A new plant for the manufacture of phosphoric acid, sodium tripolyphosphate and other sodium phosphates is to be built at Fernald, Ohio, by Virginia-Carolina Chemical Co. Construction was to begin immediately under the direction of United Industrial Constructors.

V-C operates other chemical plants in Charleston, S. C. and in Nichols, Florida where it is constructing a contact sulfuric acid plant, a wet phosphoric acid plant and a complete triple superphosphate unit. V-C also has a fertilizer plant in the Cincinnati area.

•

Appointment of Brooks M. Dyer as assistant director of sales for Columbia-Southern Chemical Corporation has been announced by W. I. Galliher, vice-president.

Associated since 1943 with Columbia-Southern, a wholly-owned subsidiary of Pittsburgh Plate Glass Company, Mr. Dyer previously served as district sales manager at St.

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CHLORDANE—Oil Concentrates; Wettable and Dry Powders; Emulsifiable Concentrates

ROTENONE—Derris and Cube; Powdered Concentrates

SABADILLA—Ground Seed; Dust Concentrates

TOXAPHENE—Wettable Powders; Dust Concentrates

LINDANE—Wettable and Dry Powders; Oil Concentrates; Emulsifiable Concentrates

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Louis and as assistant district sales manager at Philadelphia.

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•

DR. MERLIN M. BRUBAKER, has been named as assistant director of the Du Pont Company's Chemical Department, succeeding Dr. Paul L. Salzberg who has become a director. Connected with Du Pont research for 26 years, Dr. Brubaker has been director of research for the Chemical Department and director of Du Pont Experimental Station services for six years. He is a native of Northfield, Minnesota and holds degrees from Carleton College, Northfield, Minn., and the University of Illinois.

INSECT SITUATION

(*Continued from Page 55*)

were reported from Indiana and Illinois. Severe bronzing was recorded in southern Indiana. Missouri had build-ups, especially in untreated orchards, which resulted in some damage. In the western states, Colorado had a build-up in Mesa County orchards, but activity was not so marked in the Yakima Valley of Washington where weather had been cool earlier.

The codling moth was the major insect problem during July for Missouri fruit growers with infestations in some orchards being extremely heavy. North Carolina had a serious potential in its apple growing areas in mid-June, and second-brood larval activity was high in southern Indiana around the middle of July. Noticeable injury was recorded in New Jersey orchards early in the month, but the amount was still below normal for the time of year. New York reported a high level of larval activity in its western area.

Vegetable Insects

POTATO leafhopper, in addition to being a problem to alfalfa growers in several central and eastern states, caused much concern on potatoes and beans during the month. This insect was rated the outstanding pest on potatoes and the dry bean

crop in New York early in July. Delaware reported damage to potatoes and beans. Heavy populations on beans were recorded at Athens, Ohio, increases in populations on potatoes occurred in Indiana, and Michigan reported injury to field beans in many areas. Leafhoppers, (thought to be the potato leafhopper) infested commercial bean plantings in east and middle Tennessee. Thirty to 40 leafhoppers per leaf were not uncommon in these areas.

The beet leafhopper continued its invasion of cultivated fields in the West. Curly-top virus, transmitted by this insect, was found on 45 percent of the early-market tomatoes in Washington County, Utah. Some fields of tomatoes were plowed up in several counties in New Mexico because of curly top. Twenty percent of the tomato fields in Lea County were plowed up by the midde of the month.

Beet webworm was reported as abundant in sugar beets in the North Platte Valley, of Nebraska with many fields requiring insecticides for control. About the first of the month Montana had outbreaks of this insect in several sugar beet areas.

Cutworms, damaging in many states earlier in the season, caused severe damage to sugar beets in Montana areas early in July. These pests were also very destructive to tobacco in several North Carolina counties in mid-June.

Cotton Insects

THE boll weevil situation in the southeastern states presents a serious problem. During early July, rather heavy infestations of weevils were present in the cotton-producing counties of Virginia. The over-all population in North Carolina was the highest since 1950 with most counties generally infested. By the latter part of the month practically all non-treated cotton fields in South Carolina were heavily infested. The square infestation in 22 fields averaged 71 percent. (In treated fields, the average was 27 percent.) In Georgia the situation continued serious with counts in untreated fields averaging 66 percent infested squares as compared to 36 percent the previous week. Treated fields averaged 16 percent compared to 22 percent the week before.

Infestations in Alabama are heavy in some areas. In Mississippi, Tennessee, Arkansas, and Louisiana, the boll weevil picture was not as serious, comparing generally to last season. However, increased populations are noted and recent rains could cause the development of a problem more serious than last year's. Populations have been relatively low in Texas, but recent rains in the coastal bend area have brought about increases in some counties. Although still light in Missouri, weevils were found in that state during the week ending July 3rd which was the earliest record in years.

Other cotton insects causing concern during July were thrips in Merced County, California, where they were more severe than last year; the cotton fleahopper in Louisiana, in parts of Texas, Oklahoma, and Arizona; lygus bugs in Tulare and Fresno Counties, California, Dona Ana and Luna Counties, New Mexico, and Missouri and Arizona. Heavy infestations of spider mites were found in Riverside County, California and spotted in a few fields of South Carolina, but generally light throughout the cotton area. Bollworms were increasing in South Carolina, North Carolina, Louisiana, Missouri, Oklahoma, and Texas.★★

PINE TREE DISEASE

(*Continued from Page* 55)

spray applied during the same period.

(4) Foliage on trees where infection by *H. lethale* had been appreciably reduced by spraying was retained an average of eight months longer than foliage on the same trees which had been heavily infected with this needle cast fungus the year before.

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(5) The fixed copper spray when applied at the rate of 16 pounds per hundred gallons of water throughout the growing season caused appreciable stunting of the newly emerging needles. This stunting did not seem to affect seriously the general vigor of the sprayed trees, however. Unsprayed needles which emerged the following year on the same trees were normal in length.

(6) Observations in the sprayed plantation indicate that, generally speaking, the more vigorous trees were less heavily infected. All trees under study in the plantation showed heaviest infection in the lower crown. These conditions may be associated directly or indirectly with vigor, with the method of spore dispersal, and with the air movement and comparative rates of drying at different levels above the ground.★★

USE CALIF. FERTILIZER

(*Continued from Page* 41)

tion of pastures in California during the last eight years with the use of mixed seeds and proper fertilization, and irrigation, has been phenomenal. This is bound to grow and become the basis of livestock production in California.

Experience in other parts of the United States has shown that there is no one particular plant food that is the answer to all problems. A combination of the various types of nitrogen, phosphorus and potash, together with minor elements, is essential. What works on one soil may not work on another.

The fertilizer business, particularly in California, is a prescription business. By the nature of it, it is also a considerable matter of trial and error. Those in the seed business and those in the plant food business, have a community of interest, and by an understanding of each others problems can certainly enable the farmer to grow better and more profitable crops, which after all is the basis of our prosperity.★★

GRAIN STORAGE

(*Continued from Page* 32)

State and Federal agencies, grain dealers' organizations, several commercial pest control operators and some industrial representatives participated in the Oklahoma program. The demonstrations were held at four farmers' elevators, Hobart, Kingfisher, Medford and Buffalo, and there were 50 to 75 people, mostly country elevator operators at each meeting. Among the individuals on the program for handling arrangements were:

James R. Enix, assistant extension economist, Oklahoma A & M College; T. E. Loveridge, Food and Drug Administration Inspector, Oklahoma; H. H. Walden, Bureau of Entomology and Plant Quarantine, Manhattan, Kansas; C. F. Stiles, extension entomologist, Oklahoma A & M College; Robert Jordan, grain inspector, Oklahoma City; W. B. Combs, U. S. Department of Agriculture, Chicago, Ill.; A. E. Gray, U. S. Fish and Wildlife Service, Oklahoma City; W. O. Nelson of the same angency, located at Manhattan, Kans.; Clyde A. Bower, Director, Division of Entomology and Plant Industry, State Board of Agriculture, Oklahoma City; Roy Bender, Secretary, Farmers' Cooperative Grain Dealers Association, Enid, Okla.; Edward Humphrey, Secretary, Oklahoma Feed and Seed Dealers' Association, Enid, Okla.; Tom Graham, Graham Pest Control Co., Oklahoma City; Tillman Zeigler, Dead Shot Chemical Company, Oklahoma City; W. J. Pinkston, Capital Termite Control Company, Oklahoma City; and Jarvis Craig, Enid Termite Control Company, Enid, Oklahoma.

P_2O_5 FERTILIZERS

(*Continued from Page* 36)

the limiting factor lies in how far we are willing and able to progress in the production, merchandising and scientific research phases of our industry. We must realize that progress will be achieved by team-work, by in-

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The book is pocket sized (5 x 7½ x ½ inches), bound with a flexible leatheroid cover, for convenient, practical use. It includes more than 100 tables for practical everyday use. Conversion formulas and examples illustrate application to specific uses.

Insect Control by Chemicals

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817 pages. This text traces the relation between molecular structure and toxicity; classifies the insecticides and gives their chemical, physical properties; discusses the hazards to avoid in formulation, mixing and use of compounds; and illustrates modern application equipment, including nozzles; sprayers, blowers, etc;

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tegrating our efforts with those of other agencies, both governmental and private. These efforts will be focused on convincing farmers that fertilizer is an indispensable tool in farm production for reducing the crop unit cost of production. Under the spur of necessity, we have already tasted some of the fruits of this teamwork. How else can we explain the remarkable increase in production and consumption of fertilizers during the past decade or so?—an increase from about 8 million tons in 1939 to 22 million tons in 1952. Chemistry, biology, engineering and managerial skills on the farm, in the laboratory, in the factory and in the market made this record achievement possible.

In this past period of accomplishment we see how new, concentrated nitrogen solutions derived from synthetic ammonia, were blended successfully with highly purified, concentrated potash salts, higher analysis phosphates, difficult-to-handle solid ammoniates of 32 to 45 percent nitrogen content to produce acceptable concentrated mixed fertilizers. Much work had to be expended by production men, agronomists and plant breeders, in learning how to adapt these new materials to their purposes. We have a great deal yet to learn.

The new and broader concept of the role of fertilizer in farm practices and in the national economy will keep on generating demand for plant food — a demand influenced more by the needs of nutrition, sound farm practices and national security than by the size of the previous year's cash-farm income.

The leadership and managerial skill of the fertilizer industry now face this challenge of a greater public concern for the future of our soils and of public health. Never in its long years of service to agriculture and the Nation has our industry had a greater opportunity to serve the public interest (and incidentally its own), than this of the next 25 years.

We can meet this challenge by raising our sights — and particularly by over-hauling many of the traditional methods of merchandising our products. Farmers are now better informed, better trained, more receptive to new ideas than in the past. They want the help which our products can give them in meeting their production problems and in making their operations pay a profit. Sales policies and selling techniques need revamping, modernizing, to fit in with our broader concept of service. Where is sales efficiency? Sales methods are still in the Model T stage. We are in the situation in which scientists, government agencies, and many of our own leaders are creating demand, and production engineers perfecting techniques and equipments in order to produce more at lower unit cost. But, to what purpose their efforts unless distribution plays its essential coordinate role? Sales is the catalyzing agent that joins production and consumption to yield *profit*.

How can we make the farmer realize that the best investment he can make is that small profit-margin our industry requires in order to support needed research, improved distribution services and development of better fertilizers at lower cost per unit of plantfood? Selling our product at the cheapest per ton price will not benefit him in the long run.

These is good reason to be optimistic about the future. Certainly, tomorrow's fertilizer processes and products will be superior to those of today. Agriculture is not now making full use of the fertilizer tool already developed by research. Tradition and habit are formidable obstacles to scientific advances not only on the farm but in business also. Old materials and plant locations need reappraisal in order to justify themselves under our changed economy. Transportation costs necessitate a study of present locations with reference to the consuming areas to be served and the markets to be reached economically.

We have had 13 years of consecutive increases in the consumption of fertilizers — a sellers' market. It may be that from now on we may be entering a new phase — a buyers' market. But we know that without fertilizers in adequate amounts, modern farming practices cannot get the maximum acre yields and the highest

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output per man. Fertilizer must be used increasingly if modern agriculture is to produce the food and fiber for the growing populations of the world.

Where is there an industry with a greater potential growth opportunity. Business is literally being created for us by other agencies — population growth, agronomic and soils science research, and promotion by federal and state government agencies. We need the vision and imagination and courage to grasp it.

Let us stop worrying about and performing autopsies on the dead yesterdays. We have today and tomorrow. Last year, U. S. agriculture consumed 22 million tons of fertilizer and about 30 million tons of lime. By 1965 it is estimated our agriculture will be consuming about 40 million tons of fertilizers or about 10 million tons of actual plant food. Fantastic? Not at all. Back in the late 20's who would have prophesied that in 25 years American farmers would be consuming 22 million tons of fertilizers by now? That would have been considered lunacy. Our sights must be set high, and creative salesmanship must aim at that target. ★★

MEAT CONTAMINATION

(*Continued from Page 39*)

weeks, but showed no further increase during the remainder of the 16 weeks' period.

The feeding of 5 p.p.m. of technical aldrin, which was equivalent to 3 p.p.m. of pure aldrin, caused storage of the insecticide in the fat of calves that increased gradually during the first 12 weeks of feeding, but showed no further increase during the remaining 4 weeks. The maximum residue was 13 p.p.m. When the same dosage was fed to sheep, the amount stored in the fat gradually increased to 10 p.p.m. at the end of the 16 weeks.

The feeding of aldrin at four dosages makes possible a study of the relationship of dosage to the amount of storage. The ratios of maximum storage to dosage were as follows:

P.p.m.	Ratio	
	Calves	Sheep
3	4.3	3.3
5	—	3.4
10	4.9	5.3
25	3.1	3.1

If one assumes that the feeding of 25 p.p.m. of aldrin gave a maximum storage in 8 weeks, at which time the experiment was concluded, then the ratio of storage to dosage for both sheep and calves was highest at a dosage of 10 p.p.m.

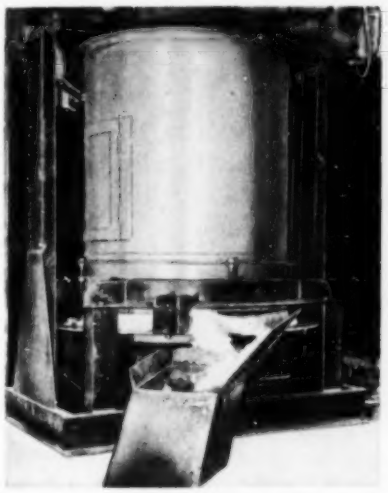
Dieldrin. — Dieldrin was fed at only one dosage, 25 p.p.m., but the amount stored in the fat of both sheep and calves was practically the same as obtained from feeding the same dosage of aldrin.

Methoxychlor. — No detectable residue was present in the fat of sheep or calves after being fed 10 p.p.m. of the insecticide for 4 weeks.

DDT. — The feeding of 10 p.p.m. of DDT for 4 weeks caused 3.1 p.p.m. to be stored in the fat of sheep and 6.8 p.p.m. in that of calves.

Chlordane.—When chlordane was fed at a dosage of 25 p.p.m. for 8 weeks, the storage in the fat reached a maximum of 18 p.p.m. for the calves and 12 p.p.m. for the sheep. When feeding of the insecticide was discontinued, the residue was eliminated by the sheep in 4 weeks. The residue in the fat of the calves decreased to 5 p.p.m. in 8 weeks and was completely eliminated in 20 weeks.

When chlordane was fed to sheep and calves at a dosage of 10 p.p.m., the storage of the insecticide reached a maximum of 11 p.p.m. in the fat of calves after 4 weeks' feeding and did not increase above the limit of experimental error during the remaining 12 weeks. The residue in the fat of the sheep reached a maximum of 16 p.p.m. after 8 weeks' feeding. Our observations on rate



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of elimination suggest that these residues would be eliminated in 4 to 8 weeks.

Conclusions

SOME recent publications on insecticide residues on forage crops (5, 6, 7) indicate that most of the dosages used in these studies were higher than would be encountered in actual practice. Until more data are obtained on residues resulting from insecticide applications effective in insect control on forage crops, it will not be possible to indicate safe procedures in the use of certain of the insecticides studied herein. It must be remembered that the insecticide residues in meat are present only in the fat, and as the edible meat of a medium-fat carcass trimmed for retail contains on an average 18 percent of fat (11), the parts per million of residues in edible meat may be obtained by dividing the results of the fat analysis by 5.5.

It might appear that the variation in the length of feeding time used in these experiments would not permit comparisons of the storage of the various insecticides. However, it will be noted that in the longer feeding periods the residues showed a tendency to level off and that the maximum storage was reached in 4 to 8 weeks. This was especially true for the lower dosages. Therefore, the maximum storage reached during the shorter feeding period probably would not have been greatly increased had the feeding been continued for 16 weeks. Our data show that toxaphene causes the lowest residue followed in order by DDT, chlordane, dieldrin, aldrin, and BHC. Methoxychlor caused no detectable residue in the fat of sheep or calves. The rate of elimination has a direct relationship to the amount of storage. The insecticides that produce the lowest amount of storage are most readily eliminated from the fat.★★

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S. C. MEETING

(*Continued from Page 57*)

remaining on the farms." In fact in recent years, the 16 per cent of Americans living on the farms has been called upon to produce food for the urban 84 per cent. "It is a fine tribute to our American initiative and ingenuity that this has been accomplished," he said.

Feed 500 Million?

DURING the morning session Tuesday, June 23, three men from the South Carolina Experiment Station presented a panel discussion on "What Population Can Be Fed Adequately by American Farms?" Dr. E. J. Lease, head of the nutrition department, Clemson, S. C., summarized the general feeling of the participants when he said, "We seem to be well-agreed that American farms can produce about three times more than they are now producing."

Dr. Lease opened the discussion, stating that because it takes more land to produce a given amount of animal food than it does to produce a corresponding amount of plant food, most Americans experience a meat deficiency in their diets.

Dr. G. H. Aull, head of the department of agricultural economics and rural sociology, Clemson, following Dr. Lease, pointed out that "the

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farm production in this country is closely related to the products of industry," such as tractors, combines, and hay bailers. He said that "the greatest need toward the' increased production we could have is better management."

Dr. Aull estimated that "with the knowledge we now have . . ., the existing acreage could provide for one person per acre, or for 500 million people."

As the final speaker on the panel, Dr. H. P. Cooper, of the S. C. Experiment Station, emphasized the history of agricultural research, then added that when we consider the short time research has been underway and the tremendous amount of progress already made, it is hard even to estimate what America's production could be.

Earlier in the morning, the visitors heard Thomas C. Law, of Law and Company, Atlanta, Ga., as he spoke on "Chemical Control in Industry." Mr. Law said that "a regulatory law fairly enforced is the greatest possible protection to the honest manufacturer."

G. W. Brandt, associate dairy husbandryman, S. C. Experiment Station, Clemson, followed Mr. Law with a discussion on "The Relation of Nutrition to Fertility in Dairy Cattle."

The two-day conference closed Tuesday evening, June 23, following a buffet supper.

HOPE SPEAKS UP

(*Continued from Page 50*)

culture in their own areas but none of us have too good an idea of the problems of those areas where agriculture is quite different from our own.

We not only want to hold formal hearings, but as far as possible, I hope the Committee can arrange informal meetings with groups of farmers where we can talk things over on a man-to-man basis.

A part of the trip and in fact as much of it as possible will be made in a chartered bus so that the Committee will have the opportunity to observe agriculture at first hand and can make unscheduled stops if desired to inspect farms and processing plants for agricultural commodities.

This nation has demanded much of its farmers in recent years and they have responded magnificently. I want to repeat that with our increasing population and our greater responsibility as the world's leading nation, the farmers of this country face an even greater challenge in the future. I am sure that working together they will meet it in just as splendid a manner as they always have in the past.★★

•

To BEPQ Quarantine Post

Eugene P. Reagan has been named assistant chief of the Bureau of Entomology and Plant Quarantine, U.S.D.A. by Avery S. Hoyt, Bureau Chief. Mr. Regan will be in charge of regulatory activities of the BEPQ.

This appointment fills a post vacant since the late Dr. S. A. Rohwer transferred from the Bureau in December, 1950. Mr. Regan has been located in Washington, D. C., serving as assistant leader of the Division of Plant Quarantines. In his new job, he will be responsible for the administration and enforcement of Federal plant quarantine legislation that prevents entry of destructive insects or plant diseases, and retards or prevents the movement of such pests already established in limited areas of the United States. His authority will encompass all plant quarantine stations in the United States and its possessions.

A native of Texas, Mr. Regan began his Federal quarantine work in 1929 as junior plant quarantine inspector at Mercedes, Texas. In 1934, he was transferred to Brownsville, where he became assistant to the inspector in charge. He served in a similar capacity at Laredo, Tex. from 1942 to 1944, at which time he became inspector in charge of the Nogales, Ariz. plant quarantine station.

Mr. Regan obtained his Bachelor of Science degree in agriculture from Texas A. and M. College.

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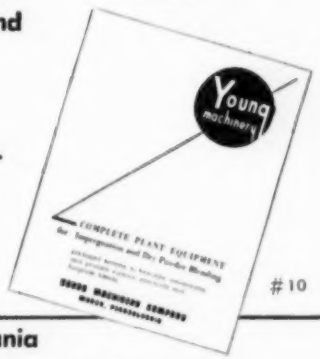

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Situations Wanted:

AGRICULTURAL CHEMICALS SPECIALIST: Widely experienced production and sales supervision, development, technical service—insecticides, fungicides, herbicides, defoliants. Good educational background, chemistry and biology. Seeking attractive managerial or administrative position. Will consider any location. Address Box No. 764, c/o **Agricultural Chemicals.**

CONSTRUCTION & MANAGEMENT EXPERT: Long experience construction, management, operation of insecticide, fungicide, herbicide plants in wide areas of U. S. and Mexico. Handled all purchasing, formulating, registering, sales; supervised large scale testing of materials in field. Broad personal contact with commercial, state, Federal entomologists, plant pathologists, agronomists in U. S. & Mexico. Available now. Address Box No. 765, c/o **Agricultural Chemicals.**

AGRONOMIST, M. S., 29, desires position in herbicidal field preferably on West Coast. Experience includes screening potential herbicides with U.S.D.A. Will consider technical sales. Brochure on request. Address Box No. 766, c/o **Agricultural Chemicals.**

ENTOMOLOGIST: Ph.D., Fifteen years experience including experiment station and commercial research and development of insecticides, fungicides and herbicides. Excellent background in chemistry, plant pathology, agronomy, horticulture and other allied fields. Have broad knowledge of production problems, quality control, labeling, surfactants and formulation problems including aerosols and other specialty products. Well qualified for position of primary responsibility. Available immediately. Address Box No. 768, c/o **Agricultural Chemicals.**

COAST SALES: Experienced salesman with twenty years in both agricultural and household insecticides and related products is available to cover west coast for manufacturer of raw materials or finished products. Can operate sales office and attend to all details. Not interested in introducing new products or straight commission deals. For further details address Box No. 769, c/o **Agricultural Chemicals.**

SALESMAN: College graduate with four years experience covering both bulk and small package agricultural chemicals sales in mid-west and southwest seeks new position with progressive manufacturer in east or south eastern seaboard. Degree entomology. Same job past four years. Good sales record. Excellent reference. For full information, write to Box No. 770, c/o **Agricultural Chemicals.**

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WILL BUY: Organization long established mid-west will buy going business in insecticides, fertilizers, and allied chemical products located south or southwest. Interested chiefly in plant manufacturing and mixing facilities. Give full details as to equipment, territory now sold, volume, etc. in confidence to Box No. 771, c/o **Agricultural Chemicals.**

DIRECT RESULTS: Your classified advertisement in this page can be seen by the entire agricultural chemical industry. You can secure fast and direct results at low cost for a new salesman or plant man, a better job, a piece of used equipment, etc. Cost only 10c per word, $2.00 minimum. Persons seeking employment at half this rate. For direct results, try a classified advertisement in **Agricultural Chemicals.**

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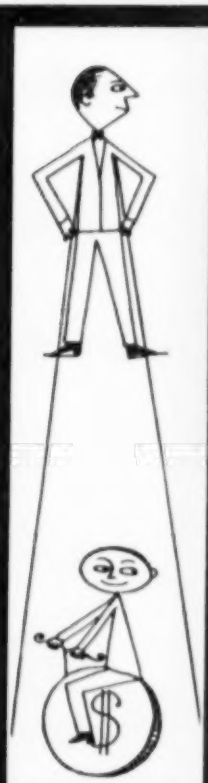

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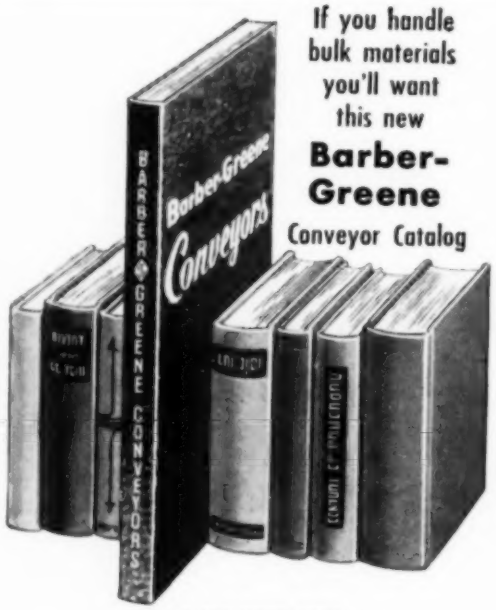

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Blight in New England

Late blight on tomatoes has been discovered in Massachusetts, according to a report received from the Federal-State Plant Disease Warning Service. No blight could be found on potatoes, however.

Conditions in other New England states has been right for the appearance of the blight. Intermittent rains, cool nights, heavy dews and warm days have been particularly well-suited for spread of the fungus which causes late blight.

In warning farmers in the area of the proximity of late blight, the Connecticut Agricultural Experiment Station, New Haven, advises the use of fungicides either as sprays or dusts, as the best measure to prevent loss. Presumably, growers in the state were heeding this advice at press time, early in August.

•

New Agency for Chase Bag

Appointment of William Hart Adler, Inc., Chicago, as its advertising agency has been announced by Chase Bag Co., Chicago. The announcement was made by R. N. Conners, executive vice-president of Chase.

The bag firm reports that an expanded program of advertising and sales promotion is under way and will include numerous media. A sales training program is also included in the program.

According to Mr. Conner, the program reflects the continued expansion of the company which has been in the field since 1847. Thirty sales and branch offices are operated by Chase from coast to coast. The firm manufactures various types of packaging materials including paper, textiles, and polyethylene products, many of which are used in the agricultural chemical field.

•

CSC Appoints O'Leary

Commercial Solvents Corp. has announced the appointment of James V. O'Leary as field sales manager in the Industrial Chemicals and Animal Nutrition Division. He has been with the corporation since 1927.

•

New Safety Executive

W. R. Benn, safety engineer of the H. K. Ferguson Co. was elected chairman of the safety committee of the National Constructors Association in a recent meeting. The committee seeks to reduce accidents on construction projects of chemical plants and other types of industrial building. Mr. Benn has been associated with Ferguson for two years.

INDUSTRY MEETING CALENDAR

Connecticut Agricultural Experiment Station Annual Field Day. Experimental Farm. Mt. Carmel. Conn., August 19.

American Phytopathological Society (In connection with American Institute of Biological Sciences). University of Wisconsin. Madison. September 6-10.

American Chemical Society. Fall Meeting. Conrad Hilton Hotel. Chicago. Ill., September 6-11.

Twentieth Annual Fall Meeting. National Agricultural Chemicals Association. Essex and Sussex Hotel. Spring Lake. N. J., September 9, 10 & 11.

Association of Official Agricultural Chemists. Shoreham Hotel. Washington. D. C., October 12, 13 & 14.

Association of American Feed Control Officials. Shoreham Hotel. Washington. D. C., October 14 & 15.

Association of American Fertilizer Control Officials. Shoreham Hotel. Washington. D. C., October 16.

Association of Economic Poisons Control Officials. Shoreham Hotel. Washington. D. C., October 17.

Entomological Society of British Columbia and Entomological Society of Canada. Empress Hotel. Victoria. B. C., Oct. 19-21.

First International Congress for Plant-Protection. University of Naples. Portici. October 19-23.

Fertilizer Safety Section. National Safety Council. Chicago. Ill., October 21.

Second Annual Meeting of the Entomological Society of Canada jointly with the Entomological Society of Quebec. Quebec City. Oct. 29-31.

Thirtieth Annual Convention. California Fertilizer Association. Carmel-By-The-Sea. Calif., November 9 & 10.

Sixth Annual Pesticide Application Equipment Conference jointly with 15th Annual New York State Insecticide-Fungicide Conference. Bibbins Hall. GLF. Ithaca. N. Y., November 10-12.

Chemical Specialties Manufacturers' Association. Inc., 40th annual meeting. Mayflower Hotel. Washington. D. C., December 6-8.

Entomological Society of America. Biltmore Hotel. Los Angeles. Calif., December 7-10.

Illinois Custom Spray Operators' Training School. University of Illinois. Urbana. January 21-22. 1954.

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Tale Ends

THE "Organic Life Foundation", with headquarters at Los Angeles, has sent us a copyrighted pamphlet, "Organic Life Line, Research Bulletin No. 1."

The organization is establishing centers in various parts of the U. S. to carry out research on soil and food, it says. Local groups will be known as the "Organic Life Circle", and members will report conditions existing in their localities. "This is the type of service that will bring pleasure and health to all who have a part in it", the brochure says.

Pointing out that the fragrance of plants affects their worth, the brochure says further that food will be more easily digested when eaten in surroundings of pleasant aroma.

Probably the best bit of advice to housewives who desire to be thrown bodily out of fruit stores is contained in this gem: "A good rule to follow when purchasing food is to bruise the vegetable or fruit with the thumb nail in order to detect the amount of essence, or life, contained therein. The more aroma the food has, the more life it contains."

Anybody want to join the Organic Life Cycle?

•

The words "silvichemistry" and "silvichemicals" have been coined by Dr. Arthur N. Parrett, vice-president in charge of research for Rayonier, Inc., to designate that branch of chemistry specializing in the study of complex organic chemicals made from wood (except cellulose).

Dr. Parrett explains that the prefix comes from the latin, *silvi*, meaning forest. A precedent has been set with acceptance of the words "petrochemistry" and "petrochemicals," he points out. The function of silivchemicals is to act as a binding agent for cellulose.

Committees on nomenclature for the pesticide industry might consider having Dr. Parrett sit in on some of their future sessions.

•

The fertilizer manufacturer was sitting in his home reading the evening paper when his eyes fell on attractive pictures and stories about the recent international beauty contest. Upon reading the account, and looking rather closely at the pictures, he became oblivious of his environment which included his wife, and suddenly whistled and said half aloud, "Thirty-five, twenty-seven, thirty-four!! Whewww! What specifications!"

Mrs. Fertilizer, surprised at the sudden outburst from her usually mild-mannered spouse, inquired, "Why John . . . what's this '35-27-34' that you think is so wonderful?"

Competition in the trade teaches alertness and quick thinking in emergencies, so John, regaining his composure, said, "Just think what a 35-27-34 analysis would do for our nitrogen business!"

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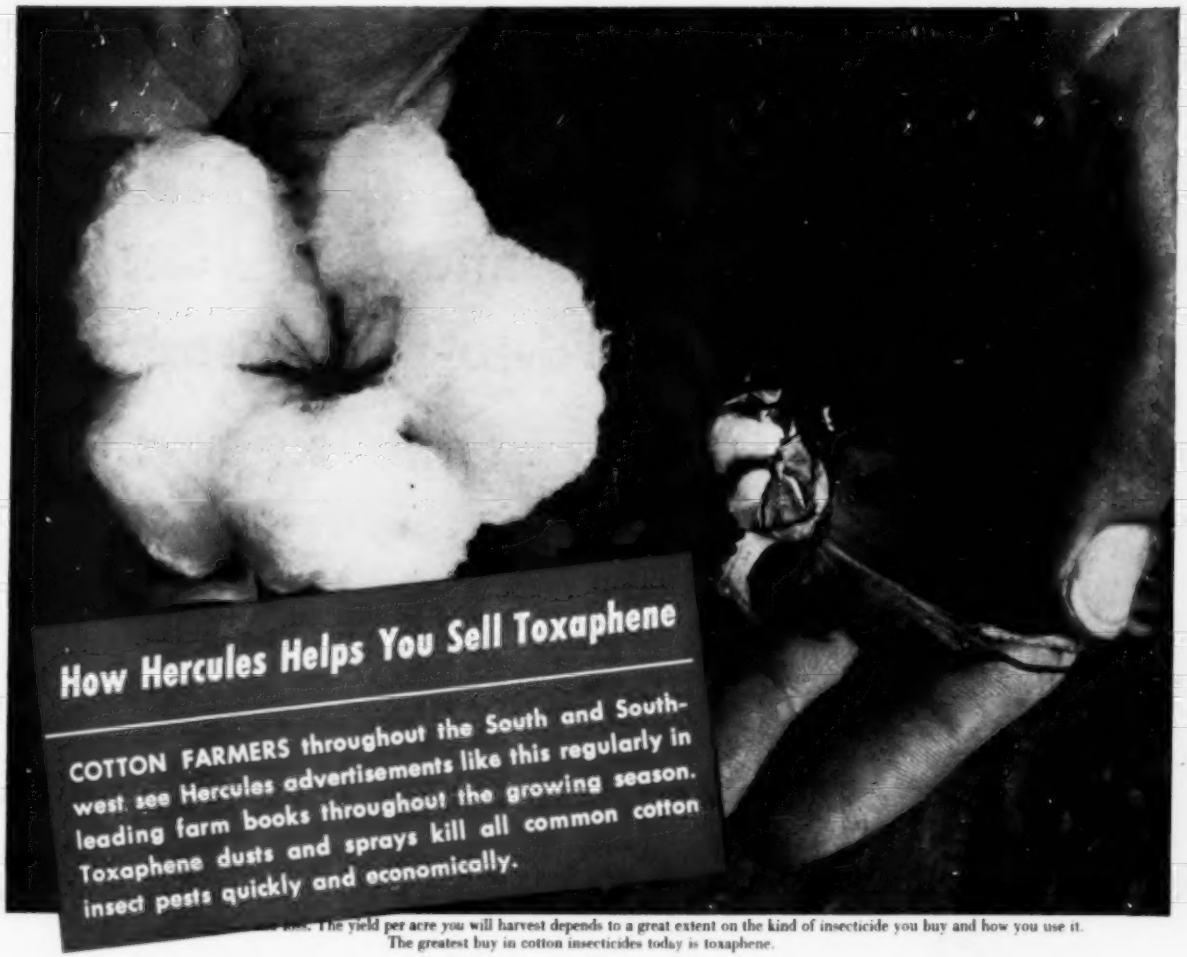
How Hercules Helps You Sell Toxaphene
COTTON FARMERS throughout the South and Southwest see Hercules advertisements like this regularly in leading farm books throughout the growing season. Toxaphene dusts and sprays kill all common cotton insect pests quickly and economically.

The yield per acre you will harvest depends to a great extent on the kind of insecticide you buy and how you use it. The greatest buy in cotton insecticides today is toxaphene.

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Healthy fields of cotton, such as this, can be *kept* healthy and free from insect damage by regular applications of toxaphene dusts or sprays. These insecticides can be used with either hand or power equipment.

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The difference between a good crop of cotton and a poor one may be decided by insect control from now to picking time. With plants on their way to maturity, don't let insect pests eat into your investment. Use toxaphene dusts or sprays regularly!

No cotton insecticide controls so many harmful insects so well as toxaphene. Toxaphene dusts and sprays are low in cost, economical to apply, and easy and agreeable to handle. Check their *actual cost per acre* with your supplier, and be sure to order enough from him to carry you through the season.

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970 King Street, Wilmington 99, Del.
Plants at Brunswick, Ga., Hattiesburg, Miss. Offices at Atlanta, Birmingham, Brownsville, Dallas, Los Angeles, Raleigh.

This 16-page folder, illustrated with full-color drawings, enables you to quickly identify most of the harmful insects that attack cotton, and gives valuable information on their habits. Write for free copy. We also have a new film, "Cotton Insects and Their Control," which you can see by contacting your county agent.

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